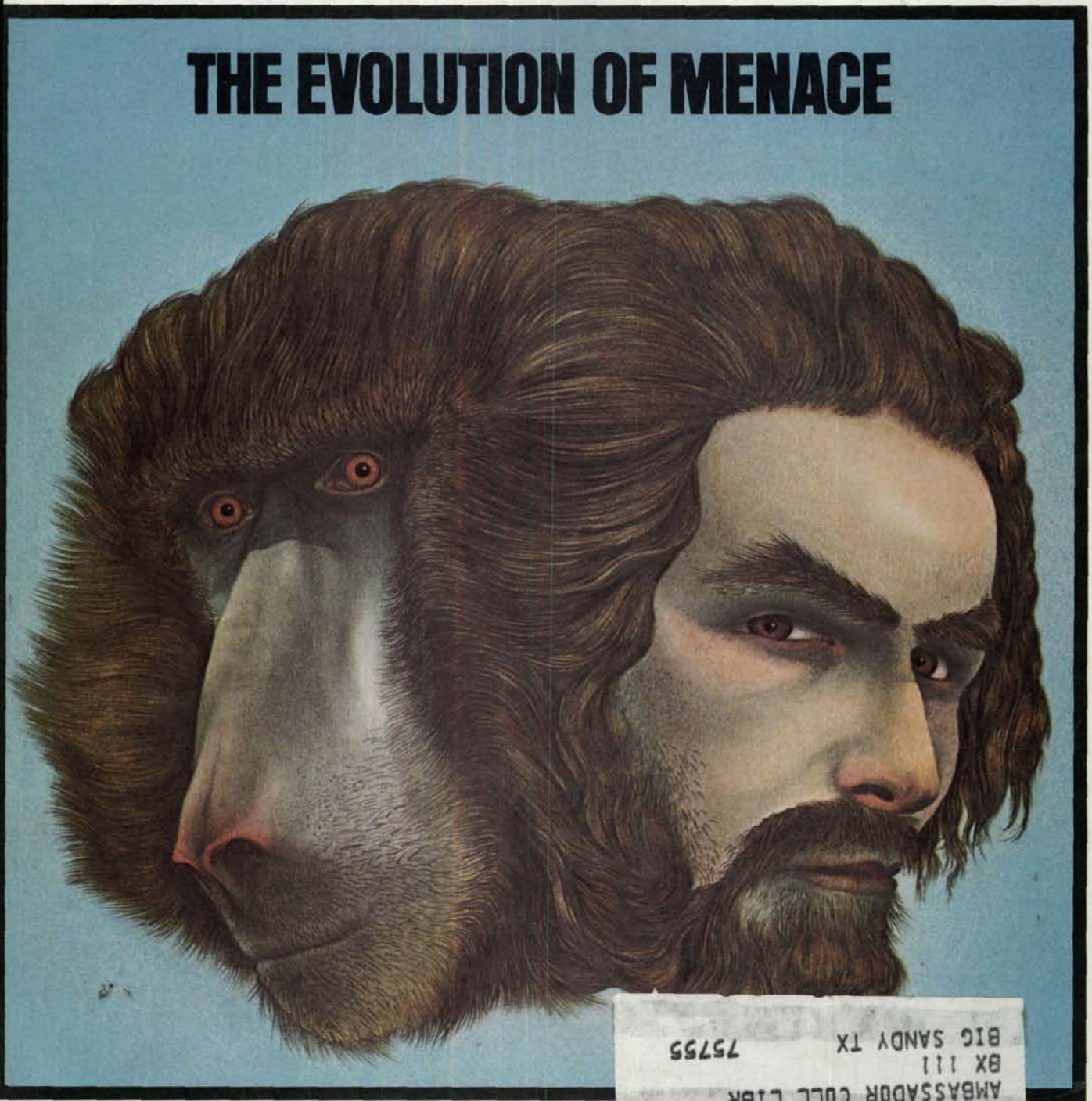
AMBASSADOR COLLEGE LIBRARY
Big Sandy, Texas

MAY 1973 ONE DOLLAR

Saturday Review of THE SCIENCES

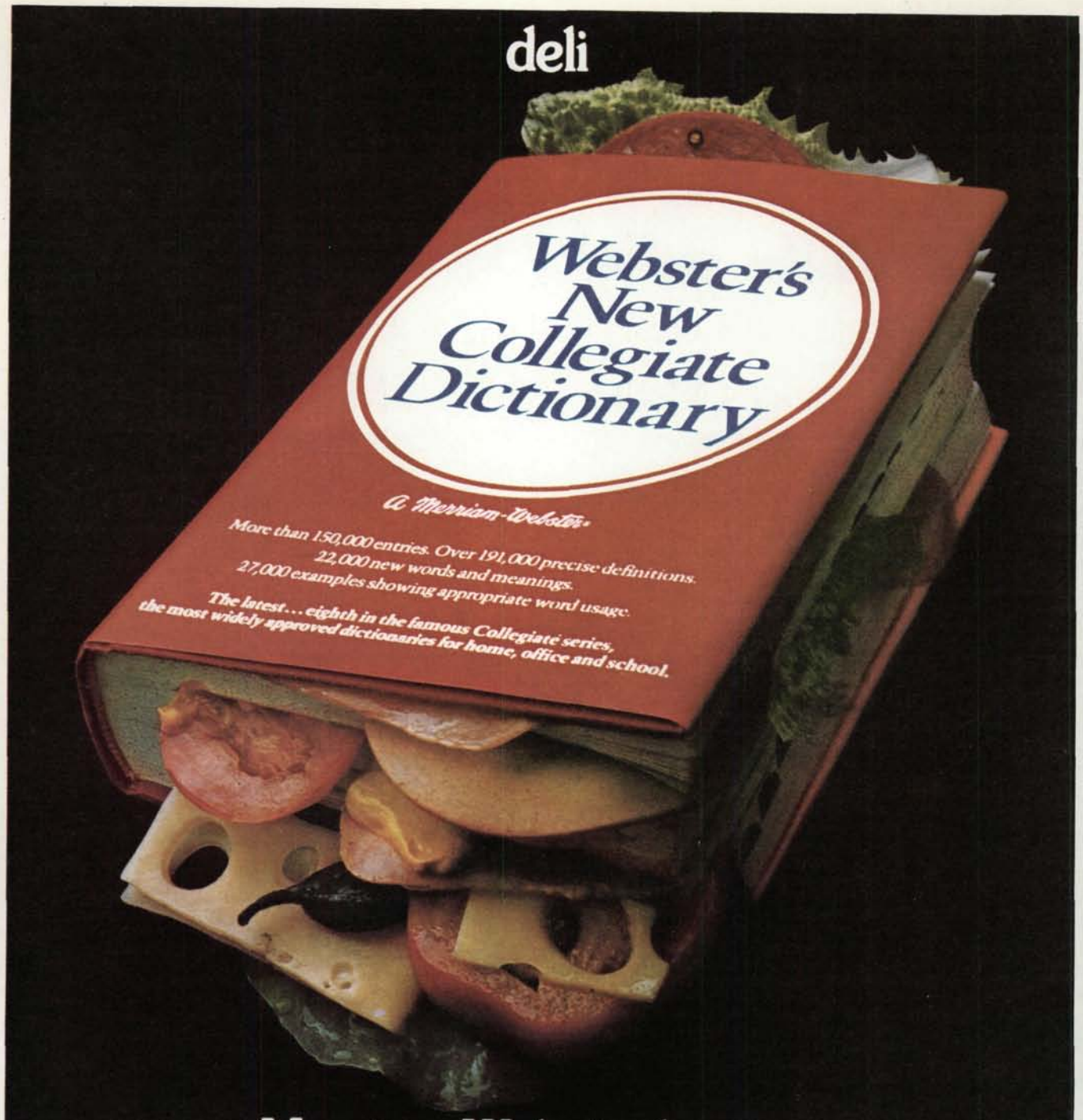
The Economics of Breast-Feeding • The Theta Experience

France's Medical Mystery Machine



430 R75755888 4AMBBOX94EC4FE874
AMBASSADOR COLL LIBR
BX 111
BIG SANDY TX 75755

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED


deli
Webster's New Collegiate Dictionary
A Merriam-Webster
More than 150,000 entries. Over 191,000 precise definitions.
22,000 new words and meanings.
27,000 examples showing appropriate word usage.
The latest... eighth in the famous Collegiate series,
the most widely approved dictionaries for home, office and school.

Merriam-Webster has just published the greatest dictionary of its kind. It's where the words live.

Your present dictionary just became outmoded, outdated and obsolete. There's a new one here from the people who have sold more dictionaries than anyone else in America. Merriam-Webster presents Webster's New Collegiate Dictionary.

It doesn't just define words.

It makes words come alive.

New firsts like 3000 vivid quotations from writers, poets, American Presidents and hundreds of other sources, in addition to 24,000 descriptive phrases, plus new pictures and tables, plus 22,000 new words, many of which, like "deli," are in no other desk dictionary. Over 191,000 precise definitions – all reflecting the lively language of the Seventies.

Everything in it is designed to make words easier to use than ever before.

Buy one for your family, or as a gift. Wherever books are sold.

Merriam-Webster Dictionaries, Springfield, MA. 01101.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

WAR DECLARED!

America's two leading consumer periodicals, Consumer Reports and Moneysworth, are pitted in a fierce circulation war. At the moment, Consumer Reports is ahead, with a top circulation of 2,000,000 (vs. Moneysworth's 850,000), but Moneysworth is gaining fast. Consumer Reports has been around for nearly 40 years, while Moneysworth was launched *only three years ago.* The reason for Moneysworth's meteoric success is simple: It publishes articles that are shrewd, lively, supremely *useful.* Consumer Reports, on the other hand, has degenerated into a stolid, conservative, dull technical journal. As its 72-year-old president, Colston E. Warne, admits: "We can't do much freewheeling because of the institutional nature of our organization. I guess, in a way, we are part of the Establishment now."

Moneysworth is anything *but* part of the Establishment. It is a young, brash, deep-digging investigative journal, relentless in its pursuit of *the hard facts* for alert, thrifty consumers. Perhaps the best way to describe Moneysworth is to list the kinds of articles it prints:

Mercedes' Diesel: The "Lifetime" Car Rated

Air Travel at 50% Off

How to Pare Doctor Bills to the Bone—By William A. Nolen, M.D., noted surgeon and author of the best-seller *A Surgeon's World.*

The Unshrouded Facts about Life Insurance

Quadraphonic Hi-Fi: A Forthright Evaluation

Banks that Pay 10½% to 12½%

Heady Buys in American Wines

Minicalculators that Add Up to Best Buys

How to Save 20% on Your Food Bill

The Third Most Expensive Item You'll Ever Buy—It's your funeral, and **Moneysworth** tells how to minimize the grief.

Microwave Ovens: A Product Rating

Home Burglar-Alarm Systems that Are a Steal

Professional Sex Counseling, $00 Per Hour

How to Open a Secret Swiss Bank Account

Digital Wristwatches that Win Hands Down

American Youth Hostels: How the Young at Heart of All Ages Can Vacation for a Pittance

How to Earn Interest on Your *Checking* Account

How Celebrities Practice Thrift—The penny-pinching idiosyncracies of J. Paul Getty, Mrs. Nelson Rockefeller, Jack Benny, Amy Vanderbilt, Art Buchwald, Lawrence Welk, et al.

The Scandal of Undetected Bank Errors

How to Hold onto Your Auto Insurance

Providing Your Teenager with Contraception

Toys that Last: A Product Rating

Sewing Machines that Seam Fine

In Order to Form a More Perfect Union—A look at illustrated sex manuals.

"How We Live on Less than $75 a Month"

How to Collect from *Both* Blue Cross and Commercial Health Insurance

Pianos of Note

Stoves that Are a Turn-On

Sailboats that Are Winners

Jolly-Good Buys in Books, Magazines and Records by Mail-Order from England

Tax Advantages of Co-ops and Condominiums

Sickeningly Sweet: The Morbid Facts about Sugar

The Ralph Nader of Insurance—A profile of Pennsylvania's feisty Herb Denenberg.

Baby Foods Are a Crock

The Fine Art of Padding Your Expense Account

Binoculars Worth Looking Into

A Gourmet's Guide to Free Cookbooks

Cool Air Conditioners: A Value Judgment

Dog Foods Fit for King

How to Fight a Traffic Ticket

A Consumer's Guide to Marijuana

How Much to Pay for the 20 Most-Frequently Prescribed Drugs

When a Negligence Lawyer Can Make Money for You—By Melvin Belli.

The Yanks Are Coming: How to Get Dental Work Done Cheaply Overseas

Treasury Bonds for the Small Investor

Muzak in Your Home—*Free*

When in Doubt, Deduct—The ten most common forms of income-tax overpayment.

The Abbie Hoffman Method of Low-Cost Travel

In short, **Moneysworth** is a hip, reliable financial mentor. It is the quintessence of consumer sophistication.

Moneysworth differs from Consumer Reports in other respects, too:

- Our product-ratings are infinitely more trustworthy. Not long ago, for example, when Consumer Reports was inundated with reader complaints about inaccuracies in an article on luggage, the magazine admitted (to The Wall Street Journal) that its product-ratings were technically "sloppy." Also, Consumer Reports has been known to rate products that were off the market for over a year.
- Moneysworth is more topical. Since it appears fortnightly, while Consumer Reports comes out only monthly, Moneysworth scoops Consumer Reports *consistently.*
- Moneysworth is more safety-conscious. Probably the most severely criticized, and possibly lethal, consumer product of all time was the Corvair. Yet when the Corvair first came out, and for years afterward, would you believe that Consumer Reports gave it high marks?
- Moneysworth is crusading. Moneysworth's publisher was among the first to encourage Ralph Nader to pursue the subject of auto safety, and to provide him with a forum on which to express his ideas. But Consumer Reports, when offered the opportunity of publishing Nader's paperback "Unsafe at Any Speed," *rejected* it.
- Moneysworth is uncompromisingly independent and is beholden to no one but its readers. We accept subsidies, hand-outs, "grants" from *no one.* The publishers of Consumer Reports cannot say the same.
- We report on a much broader range of subjects. Moneysworth covers areas of investments and personal finance that Consumer Reports ignores *completely.*
- We are opinionated. Moneysworth does not hesitate to make recommendations. Often, when you finish plowing through the bewildering mass of technical data in a Consumer Reports product rating, you're just as confused as when you started out.
- Moneysworth is a better buy. We give you more than twice as many issues per year (26 vs. their 12), yet *cost only about half as much* ($5 vs. their $8). In other words, *MONEYSWORTH GIVES NEARLY FOUR TIMES AS MUCH VALUE FOR YOUR MONEY AS CONSUMER REPORTS.*
- Finally, Moneysworth is sold with an unqualified, unconditional money-back guarantee. *We absolutely and unreservedly guarantee that Moneysworth will increase the purchasing power of your income by at least 15%—or you get your money back IN FULL.* In other words, if you now earn $10,000 a year, we promise that the information in Moneysworth will increase the value of your income *by at least $1,500*—or you get your money back. As you can see, a subscription to Moneysworth is an absolutely foolproof investment. Meanwhile, you will have enjoyed a year's subscription *ABSOLUTELY FREE.* Consumer Reports wouldn't *dare* make the same offer.

To enter your subscription, simply fill out the coupon below and mail it with $5 to: Moneysworth, 110 W. 40th St., New York.

We urge you to act at once. Join forces with Moneysworth now—and become a soldier of fortune.

MONEYSWORTH

110 West 40th St. New York 10018

I enclose $5 for a one-year subscription to **Moneysworth**, the galvanic new consumer fortnightly. I understand that I am paying *A MERE FRACTION* of the going rate for such a publication. Moreover, **Moneysworth** guarantees that it will increase the purchasing power of my income by at least 15% or I will get my money back *IN FULL!* Meanwhile, I will have enjoyed a year's subscription *ABSOLUTELY FREE!!*

Name

Address

City State Zip

FOR EXTRA SAVINGS: Check box ☐ and enclose $10. You'll get *THREE* years for the price of two.

© MONEYSWORTH 1973. T.M. REG. PEND. 6EA

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Saturday Review of
THE SCIENCES

Property of
AMBASSADOR COLLEGE LIBRARY
Big Sandy, Texas

APRIL 28, 1973 VOLUME 1, NUMBER

SR UP FRONT

4
INSIDE SR
A look at this month's authors

5
Blushing Violet

Flat Earth Society
By J. William Johnson

10
Peanut Butter Protein

Patient Etiquette
By Solomon W. Golomb

11
Heard Melodies Are Sweet . . .

The Cause That Lost Its Issue

14
Sea Serpent Sanctuary

Accommodations in Orbit
By Patrick Young

Madding the Crowd

18
TRAVEL: This Is a Vacation?
By Edwin Diamond

20
LETTERS

21
EDITORIAL: Hercules vs. the Hydra
By Reid A. Bryson and John E. Ross
As we busily attack a many-headed environmental crisis, we tend to ignore the beast that lies beneath.

SATURDAY REVIEW OF THE SCIENCES is published monthly at $12 per year by Saturday Review Company, 450 Pacific Avenue, San Francisco, California 94133. Second class postage paid at San Francisco, California, and at additional mailing offices. Volume 1, Number 4. All rights reserved. Send all correspondence about subscriptions and remittances to: Subscription Department, Saturday Review, Box 2043, Rock Island, Illinois 61207.

Saturday Review Company publishes a family of four monthly magazines—Saturday Review of The Arts, Saturday Review of Education, Saturday Review of The Society, Saturday Review of The Sciences. Each of these special-interest magazines is available separately at $12 for one year, or all four may be purchased at the combined price of $24 per year.

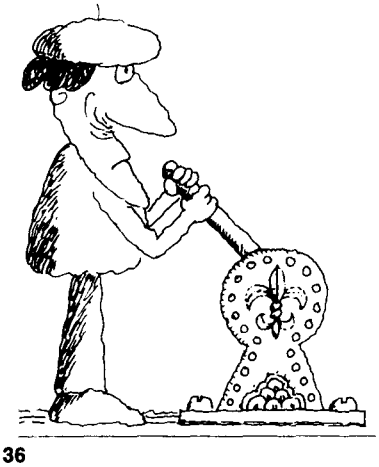
© 1973 Saturday Review Company. All rights reserved.

FEATURES

22
The Evolution of Menace
By R. D. Guthrie
All primates (including man) are equipped with anatomical features that serve to threaten and intimidate.

29
The Economics of Breast-Feeding
By Alan Berg
The liberation promised by the bottle is offset in many countries by malnutrition, disease, and widespread economic losses.

34
Power Plants & Cottontails
By Bruce Wallace
A geneticist confesses why he would be useless as a member of an environmental impact study group.



36
The French Concoction
By Daniel S. Greenberg
Leading scientists in several countries agree that it is no longer possible to ignore Antoine Priore and his mysterious medical machine.

46
The Theta Experience
By David Rørvik
The key to creativity may be hidden in the lush, subjective world of theta waves.

PHOTOGRAPHIC AND ART CREDITS
Cover John Hyatt; pp. 5, 10, 11 Nicolas Sidjakov; pp. 18-19 Educational Expeditions International; pp. 23, 24, 25, 27 John Hyatt; p. 30 Alan Berg; p. 31 E. Warncke; p. 32 Derrick Jelliffe; pp. 34-35 John Kuzich; pp. 37, 38, 43, 44 drawings by Tom Durfee; pp. 38-39 color conversion by E. Andrew McKinney; pp. 47-48 Alan Cober; p. 53 Jerry MacDonald; p. 55 Mansfield; p. 56 photograph by Steward Observatory, University of Arizona; p. 58 Masami Daijogo; p. 59 (lower left) Louis Neiheisel; p. 60 (middle right) California Institute of Technology

SR REVIEWS

53
LIFE SCIENCES
Super-sexed houseflies; air ions and that sluggish feeling; diet vs. arterial fat; Chinese clam invasion.

55
SOCIAL SCIENCES
Pseudo-patients and pseudo-data; female troubles.

56
PHYSICAL SCIENCES
Atomic art appraisal; a quake predicted; far-out quasar; Saturn's rocky rings; laser-induced fusion.

58
HEALTH & MEDICINE
Unraveling the split personality; tooth cement; growing new limbs; the male pill.

60
TECHNOLOGY
Digital time; tagging oil spills; restoring speech.

61
BOOKS
Blood
By Earle Hackett
Reviewed by Alan Anderson, Jr.
62
C. G. Jung: Letters
Selected and edited by Gerhard Adler in collaboration with Aniela Jaffe
Reviewed by Robert Sussman Stewart
63
SR Recommends
68
Genetics and American Society: A Historical Appraisal
By Kenneth M. Ludmerer
Reviewed by Bruce Wallace
69
Turtles of the United States
By Carl H. Ernst and Roger W. Barbour
The Scanning Electron Microscope: World of the Infinitely Small
By C. P. Gilmore
70
Shorter Reviews: Walking the Dead Diamond River *by Edward Hoagland;* Cooley: The Career of a Great Heart Surgeon *by Harry Minetree;* The Manipulator: A Psychoanalytic View *by Ben Bursten*

71
MUSIC: Finding the Lost Chord; Graffman; Gibbs
By Irving Kolodin

72
FILM: "Godspell": Dancing in the Streets
By Arthur Knight

GAMES
3
Wit Twister; Literary Crypt
78
Kingsley Double-Crostic No. 2036

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

WIT TWISTER NO. 328

Edited by ARTHUR SWAN

The object of the game is to complete the poem by thinking of one word whose letters, when rearranged, will yield the appropriate word for each series of blanks. Each dash within a blank corresponds to a letter of the word.

Though — — — — — in springtime by the ardent sun

That now — — — — — high in summer's sultry skies,

The blossom, by her father's stare undone,

— — — — — on her stalk and with a whisper dies.

A.S.

Answer on page 69

FRASER YOUNG LITERARY CRYPT NO. 1551

A cryptogram is writing in cipher. Every letter is part of a code that remains constant throughout the puzzle. Answer No. 1551 will be found on page 69.

U ABWT BW LCFKWR FW XC-

EYZC FKC ZCMCHP WV NHR

WZ WNBWJUWYX PHTX XW

CVVCEFUIC HX FKCUZ XFZU-

BOCBF CJCEYFUWB.

Y. X. OZHBF

"I fought my way past all the pugs . . . now it was over."

"GOOD BYE NICK"

My name was Kid Sugar. And I coulda been champ. I earned the title shot . . . the hard way. But the commissioner wouldn't give me the fight.

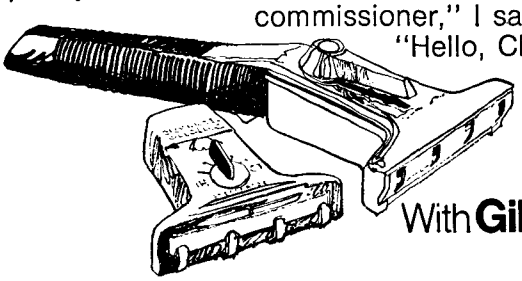
"Nick," he said, (he always called me Nick because of the cuts and scrapes I got from shaving,) "with all those marks on your face, the doctor would stop the fight before the first bell."

I'd never been cut, not in the ring. I pleaded for my chance. "Sorry Nick, my hands are tied." It was good-bye Nick. Hello skids. I fought my way past all the pugs in all the tank towns in America and now it was over.

I sat in front of my locker, trying on my gloves for the last time, when inside one of them I found a package and a note. It was a Gillette Techmatic® razor. The note said, "Nicky, I'd rather you'd have finished your violin lessons. But if boxing is your life . . . Good Luck. Mom." The Techmatic razor had a continuous band, no sharp corners to cut my face. It was light, had balance for a smooth, safe shave. All enclosed in a safety cartridge so I'd never have to touch a blade again.

Shortly thereafter I was sitting with Mom at the symphony, when the tall, gray-haired man approached. "Hello, commissioner," I said.

"Hello, Champ!"



With GilletteTECHMATIC it's good-bye Nick

©1973, The Gillette Co., Boston, Mass.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Saturday Review of
THE SCIENCES

President and Editor-in-Chief, John J. Veronis
Chairman and Editor-in-Chief, Nicolas H. Charney
Chairman, Executive Committee, Frederick S. Wyle

Editor, Nicolas H. Charney
Executive Editor, Ronald P. Kriss
Design Director, Donald K. Wright

Managing Editor, Frank Kendig
Art Director, John Isely; *Senior Editors*, Alan Anderson, Jr., Douglas Brian Gasner; *Washington Editor*, Daniel S. Greenberg; *Associate Editors*, Sally N. Bates, Cristine Russell; *Assistant Editor*, Ellen J. Weber; *Staff*, Gail Butterfield, Nancy Lee O'Leary; *Copy Editor*, Richard Zoglin; *Copyreader*, Michael Schrader; *Art Associate*, Louis Neiheisel

Book Review Editor, Eliot Fremont-Smith
Senior Editor, Joseph Kanon; *Associate Editors*, Alan Hislop, Genevieve Stuttaford; *Staff*, Holly Reppert; *Contributing Editors*, O. L. Bailey, Benjamin DeMott, Karla Kuskin

Music Editor, Irving Kolodin
Senior Editor, Travel, Kenneth Pierce
Associate Travel Editor, R. C. Smith; *Assistant Travel Editor*, Ava Swartz; *Letters Editor*, Gail Barnet; *Contributing Editors*, Arthur Knight, Thomas Meehan

GENERAL SERVICES: *Editorial Business Manager*, Joseph Sullivan; *New York Bureau Manager*, Harrie George; *Design Assistant*, Sandra Forrest; *Administrative Assistants*, Carol Ash, Page Cole, Rosemary Fisher, Nancy Gruber; *Staff*, Christine Doudna, Marilyn Kelso, Jane Walsh

Publisher, Robert J. Moore
Associate Publisher, Nicholas Listorti
Controller, Frank G. Antonsson; *Assistant Controller*, Philip Broselofsky; *Assistant General Business Manager*, Bob Harrington; *Personnel Administrator*, Carolyn Nadler; *Staff*, Barbara Levasseur, Sondra Sue Roberts
OFFICE SERVICES: Max Anonas, Irving Armstrong, Gerald DeJong, Mary Hanson, Mary Herrera, Ginger Koval, Humberto Ramirez.

Circulation Director, Mark Edmiston
Manager, John Ladd; *Staff*, Amy Camardo, Greg Cascante, Madeline Denko, Carla Graubard, Meg Greeve, Kathy Hedberg, Christine Hoover, Barbara L. Johnson, Rudolph Martinez, Valerie Pechenik, William M. Reser, Harry Sears, Patricia Tuttle

Director, Mfg. and Distribution, Jerome Alberts
Production Director, John Ahrens; *Planning*, Gary DeJong; *Production Associate*, Mary Morrow; *Staff*, Linda White

Advertising Director, Peter Veronis
Sales Manager, Peter Moore; *Promotion Director*, Dennis Barry; *Research Director*, David Larkin; *Associate Manager*, William Lieberman; *Category Managers*, Roberta Adams, Bernard Ganis, Charles Harris, Walter Koontz, William Pearson, William Rosen, Richard Setti, Duane Spong; *Advertising Services*, Virginia Medina; *Advertising Production Coordinator*, Marilyn Hiris; *Classified Advertising Manager*, Eleanor McAvoy
NATIONAL SALES STAFF: *Chicago Manager*, Frank Zilla; Peter Johnson; *Los Angeles Manager*, Granville Swope; *San Francisco Manager*, Sanford Heckinger; *New England Manager*, Leonidas Contos; *Staff*, Helen Andreadakis, Carol Andrie, Leni Friedman, Donna Golden, Barbara Harmon, Diane Insolato, Delores Neri, Loyda Pagan, Frederica Plotkin, Chris Stanton, Sylvia Taylor, Mary Thielo, Linda Tumia
Publishing Director, William D. Patterson

SATURDAY REVIEW INDUSTRIES, INC.

Vice President, Jon M. Stark
Vice President, Administration and Management, Joseph H. Therrien
Director of Personnel, Barclay Tucker
STAFF: Josephine Amalbert, Orleen Bowen, Lynn Chatley, Amelia Craig, Evelyn Curley, David Erickson, William Fugelsang, Beverlee Johnson, Ann Marie Jones, Ann Mullen, Alli Parker, John Parker.

SATURDAY REVIEW PRESS
Publisher, Irving Goodman
Editorial Director, Charles Sopkin

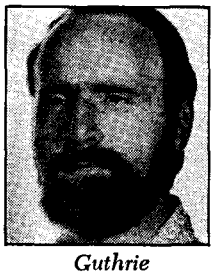
SATURDAY REVIEW BOOK CLUBS
Publisher and General Manager, Neil Zelenetz
Editor, Irma Pascal Heldman

SATURDAY REVIEW PROGRAMS
General Manager, Thayer Bigelow
Associate Publisher, Herbert J. Teison

INSIDE *SR*

Zoologist **Dale Guthrie**, author of this month's cover story, is an expert on social organs, those anatomical features that are utilized only in social interactions. For *SR of The Sciences*, Guthrie, who holds a degree in evolutionary biology from the University of Chicago, focused on the evolution and function of innate threat displays, both in animals and humans. His interest in social organs developed after he first had grown a beard: "I just couldn't walk around with the thing and not wonder how it evolved and functioned." Guthrie's forthcoming book, believe it or not, is titled *Strong Beards and Lilac Genitals*.

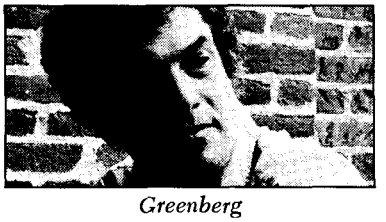
For a graphic illustration of the way in which facial changes can alter the



Guthrie

Hyatt

expression of threat, we called upon freelance artist **John Hyatt**, who proceeded to use himself as a model for the metamorphosis. On this page is John Hyatt/Jekyll; on page 23, John Hyatt/Hyde.

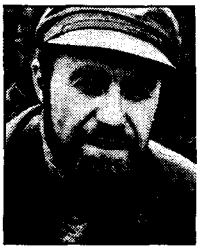


Greenberg

Daniel S. Greenberg, who regularly covers science and government in Washington, D.C., for *The Sciences*, wandered far afield last month to investigate a hot dispute in France over a mysterious machine that is reported to have near-miraculous curative powers. The difference between this miracle story and others, points out Greenberg, is that many of France's top scientists are lined up on the side of the machine. Besides serving as Washington editor for *The Sciences*, Greenberg publishes a biweekly newsletter, *Science and Government Report*. As for the French "miracle machine," he says: "I haven't the slightest notion as to whether or not it works."

Speaking of miracle cures, **David Rørvik** detested air travel—a serious problem for a writer based in Missoula, Montana—until he discovered thet training. This was not Rørvik's firs encounter with biofeedback; he wrot one of the first popular articles on th subject for *Look* in 1970. In this issu Rørvik reports on the latest phase c biofeedback research, the theta exper ence. A former science and medicin reporter for *Time*, Rørvik returned t his native Montana three years ag Since then he has written popular a ticles on such scientific subjects a cybernetics, automation, women health, and the biological revolutio and has completed six books. At pre ent he is working on three more.

Rørvik



Berg

Alan Berg's view of nutrition has a ways been somewhat special, so it not surprising that he looks at breas feeding with the dollar sign in minc Although he has never taken a nutr tion course, Berg is an acknowledge world leader in formulating policies t combat the social and economic conse quences of malnutrition in foreig countries. His article, "The Economic of Breast-Feeding," has been adapte from his book *The Nutrition Facto* published by the Brookings Institutio and funded by the Foundation for Chil Development. While working on th article, Berg was assisted by Derric Jeliffe, professor of public health an pediatrics at UCLA, and by Ann Wa kins, who works as a research assistar at Brookings.

Also in this issue **Bruce Wallace**, regular contributor to *The Science* comments on the narrowness of an e vironmental impact study. Contribu ing to *SR Reviews* are **Otto F. Thale** a professor of psychiatry at the Unive sity of Rochester medical school; **Fran Chilton**, a freelance writer and lecture in applied sciences at the University c California, Davis; and **Elizabeth Mag gio**, who reports on science for th *Arizona Star*. F.I

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Blushing Violet

Ironically, the purple dye used by the Department of Agriculture to attest to the safety and quality of cuts of meat stamped USDA Choice or Prime may itself be unfit for consumption. The dye, Violet No. 1, used for 22 years as coloring in a wide range of foods, drugs, and cosmetics, has been banned from the market by the Food and Drug Administration because of studies showing that it is linked to cancer in rats. The ban, which went into effect April 10, affects only future production; already-manufactured goods may be distributed and sold.

The dye had passed many previous FDA tests, but researchers in Japan found cancer in rats to which the chemical had been fed as 5 per cent of their daily diet. The FDA is now trying to reproduce the Japanese results.

Violet No. 1 is a water-soluble member of a family of organic triphenylmethane dyes; last year 66,000 pounds were produced, of which about one-third was used to stamp meat by the USDA.

The USDA and the food companies can use alternate dyes that, according to the FDA, are not closely related to the banned dye—for example, Red No. 2 or Red No. 40. But they may still have to come up with something new. These alternative dyes are being re-evaluated as well, and "one would expect some kind of action to be near," say FDA officials, either to clear or condemn them. □

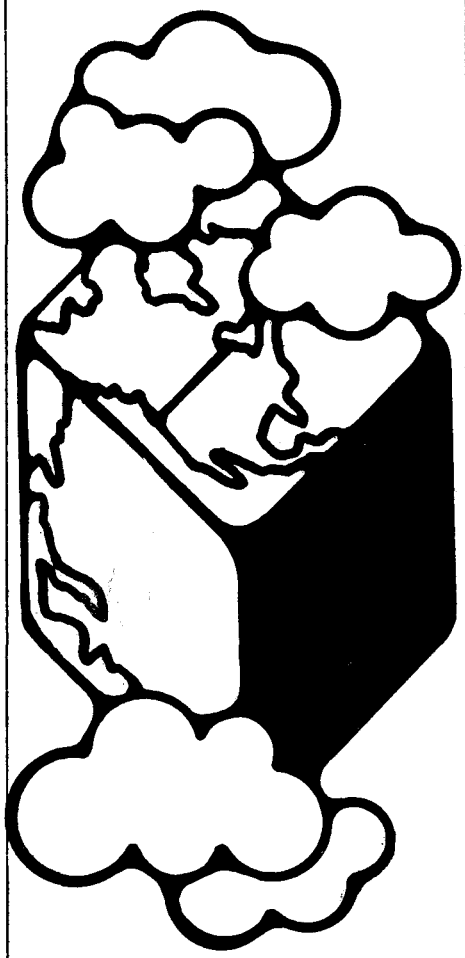
Flat Earth Society

BY J. WILLIAM JOHNSON

Having learned in my tender years that the earth is round and having had to modify this belief slightly in the 11th grade when I was informed that the earth is an oblate spheroid, I was more than a little puzzled by the slightly nasal voice coming at me from the television:

"We of the Flat Earth Society have elected to dispute the one thing our culture regards as indisputable. We openly proclaim that the earth not only is flat but may well be square."

I decided that the only way to comprehend this announcement of global heresy was to get the facts—straight



from the horse's mouth. To do this, I set out to meet this man of the society and look at the rock that he claims to have retrieved from the edge of the earth.

Dr. Leo C. Ferrari, Australian-born, world traveler, one-time chemist, is a professor of philosophy at St. Thomas University in Fredericton, New Brunswick. The university is headquarters for Canada's 54-member Flat Earth Society.

"I'm quite serious about the earth being flat," Ferrari said when I first talked to him. "We are so brainwashed, and I rebel."

I asked him to put this in context, and he directed me to the society's official organ, called *The Official Organ*. There I came across a section entitled "Official Aims." It proposed:

"To restore man's confidence in the validity of his own perceptions. For more than fifteen hundred years man has been blinded by metaphysics and coerced into denying the evidence of his senses. The Flat Earth Society stands for a renewed faith in the veracity of sense experience.

"To combat the fallacious deification of the sphere, which ever since the deceptions of Eudoxus has thwarted Western thought.

"To spearhead man's escape from his metaphysical and geometrical prison by asserting unequivocally that all science, like all philosophy and all religion, is essentially sacramental and therefore all reality, as we verbalize it, is ultimately metaphorical. . . ."

I looked up to see him smiling.

"You think I'm crazy, don't you?"

"On the contrary," I said, smiling myself. "From what I've just read, I get the feeling your stand on the shape of the earth is not really what you are trying to say."

"Exactly," he said. "We're not really *obsessed* with the shape of the earth. We say it's flat to dramatize our desire to keep our God-given senses from being numbed by technology. We want to provide some resistance to the forces of conformity. The scientific way of looking at the universe isn't the only way. The myths are dead. Mystery has gone out of life. We have to change our whole way of thinking. Believe what you see!"

He then launched into a philosophical soliloquy about the merits of St. Augustine and his own belief that all maps should be flat. Globes perpetuate prejudice by making the people at the bottom feel inferior, he said.

"What about the guy you say lives at the edge of the earth?" I asked.

"The official statement on Al, our Observer at the Edge, is that he's living at the edge of what I see!"

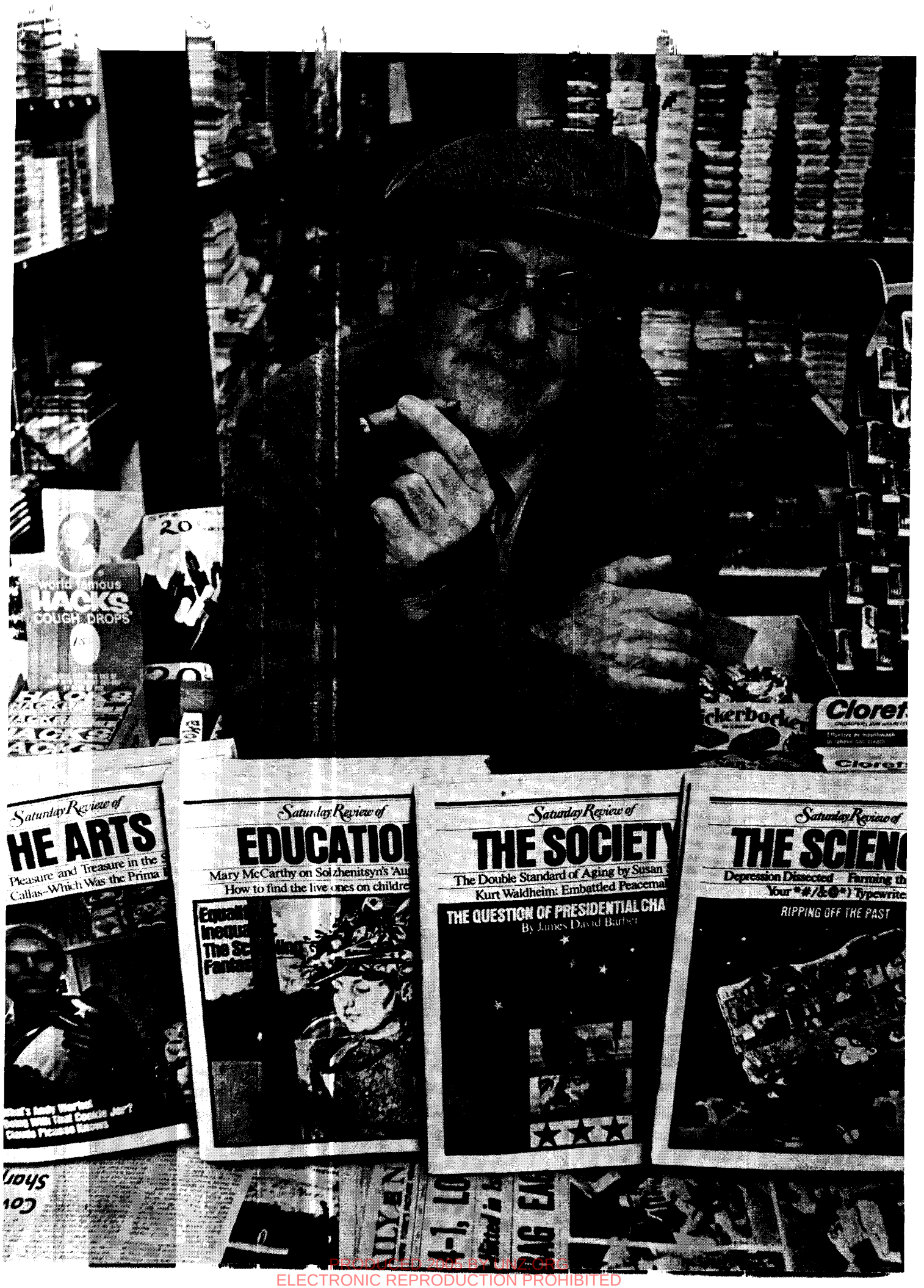
It turns out that Dr. Ferrari's sight extends as far as Fogo Island off the coast of Newfoundland, where on one calm June night he gazed over the edge into the "abysmal chasm."

"It was horror," he said. "I managed to grasp a stone for support, and that's the same rock I carried back."

Appropriately dubbed "The Sacred Stone," it now rests peacefully in the home of Dr. Alden Nowlan, one of Canada's best-known authors and the society's executive secretary.

Illustrations by Nicolas Sidjakov

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Which would you rather read?

There are now four Saturday Reviews.

Each looks at the world from a ferent vantage point.

Which gives you an interesting ›ice. Read what each magazine is ›ut, and then see if you can make a :ision about which you'd rather :eive every month.

THE ARTS

For too long, the arts have been :iphered in a palace language, which ly the initiated elite could understand d enjoy.

Well, the editors of Saturday :view have created a monthly magazine voted solely to the arts, and to :iphering the palace language.

SATURDAY REVIEW OF HE ARTS features eight regular partments: Music, Cinema, Art, ieater and Dance, Architecture and :sign, Writing, Entertainments, d People and Ideas.

It will keep you current, and volved. Some samples of articles:

¶The Perfect Rock Concert.

¶Vietnam War Art.

¶The Great American Movie Game.

¶Claude Picasso on the private llections of America's best-known ›dern artists.

¶A look at mainland Chinese crafts.

¶Street mime in San Francisco.

¶The International Arrival of :perimental sound.

You'll really enjoy SATURDAY EVIEW OF THE ARTS.

EDUCATION

In today's Knowledge Society, e problem is not getting new infor- ıtion: it is developing new ways to ırn, and to apply new knowledge.

SATURDAY REVIEW OF)UCATION is designed to help this ocess.

There is more to educational ange than turning blackboards green.

Here are some of the things you will read about in SATURDAY REVIEW OF EDUCATION.

¶VD on TV.

¶Experimental Colleges.

¶Slow Learners.

¶Equality vs. Inequality.

¶Should schooling be compulsory? Direct reports from states where it is not.

¶Changes in mass "higher education."

¶Economic and social systems in the public school microsociety.

¶Are "educational" toys really educational?

¶Do "crash courses" for College Boards really help?

¶Education beyond college.

THE SOCIETY

The individual in today's society might as well be in a pinball machine.

Virtually everything that happens in society affects his life, yet for the most part, he is almost powerless to cope with it. The future shock phenomenon just accelerates the change, and makes its impact harder to take.

Well, the editors of Saturday Review have a partial solution to the problem. It's called SATURDAY REVIEW OF THE SOCIETY, and in a way, it is a survival manual. Its job is to keep you ahead of the current turmoil in society: politics, leisure, youth, labor unions, welfare, old age, advertising, environment, technology, the economy, communications, jobs, war, freedom.

Some samples of what it covers:

¶The Doomsday Syndrome.

¶Predicting Presidential Character.

¶The American Obsession With Fun.

¶A Tax Reform Symposium.

¶The Double Standard of Aging.

¶A Product Safety Computer.

¶The Swing Justice of the Supreme Court.

¶Can Wall Street Afford a Social Conscience?

¶The Skyjacker and How to Stop Him.

¶How the Army is Destroying Itself.

SATURDAY REVIEW OF THE SOCIETY will help you to understand the changes in society before they take place, and give you a leg up on dealing with them.

SCIENCE

Though science can be compellingly relevant in our daily lives, most of us never quite learned enough of it to put it to work for us.

Even the scientist is a layman outside of his field of specialization.

Yet up until now, there has been no magazine devoted to science that is fully comprehensible to the layman, enjoyable to read, and packed with useful knowledge.

SATURDAY REVIEW OF THE SCIENCES fills this void.

Here's a sampling of articles:

¶Death of the Elephants.

¶The Anatomy of Melancholy.

¶Isaac Asimov on the Ultimate Speed Limit.

¶The Life and Death of the American Chicken.

¶Senator John V. Tunney on Genetic Management.

¶Archeological Looting.

¶Zoos where people are caged while the animals run free.

¶The psychological implications of vasectomy.

¶The technology of TV violence.

SATURDAY REVIEW OF THE SCIENCES will be the publication you'll look forward to getting every month.

Any one of these magazines is now available at the half-price charter subscription rate.

If you're torn between two of them, you can get both.

THE SATURDAY REVIEW FAMILY OF MAGAZINES.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"What about NASA and those photos from space?" I prodded, sensing he'd heard the question before.

"Einstein's theory on the curvature of space indicates the photos would be no more than optical illusions. And that's not even taking into consideration the fact that ours is probably the most gullible generation ever to walk the earth. If *The Flying Nun* had been shown on the evening news instead of in a dramatic serial, almost all of us would have knelt before our televisions and worshiped. I mean, really . . . we saw the photos on television . . . so what?"

I learned a little later that one member, Ray Fraser of Montreal, has suggested the moon shots look suspiciously like the landscape of Labrador.

"That's not the official view of the society," commented Dr. Ferrari, "but it's a possibility."

Unable to contain myself further, I spurted, "You expect me to believe any of this: the earth is flat, the moon shots were faked, the earth is not spinning?"

A quiet voice of sincere benevolence stopped me on inhale.

"I expect you to be aware and question. To quote G. K. Chesterton, 'A man should always question the strongest beliefs of his age, for those convictions are invariably too strong.'"

Strangely enough, upon that quiet note, my pencil point shattered.

I never did get to see the rock. But now and then I find myself ruminating over a poem written by Ferrari:

The philosopher
Is a timid spider
Hiding from life
In piles of paper words. □

J. William Johnson is a freelance writer living in Maine.

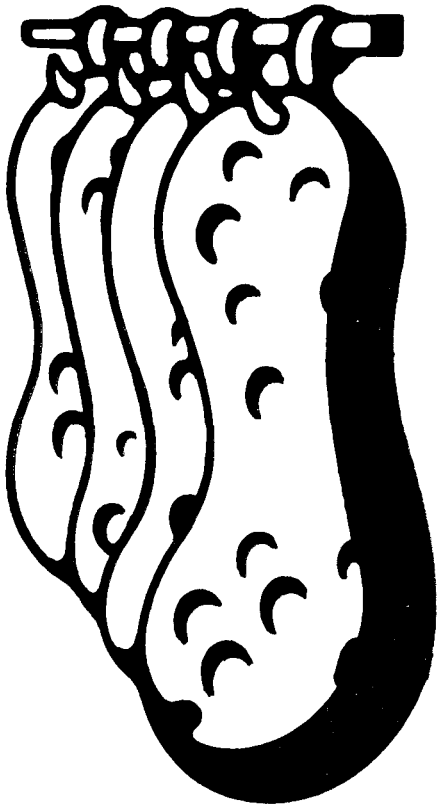
Peanut Butter Protein

As soon as they pass through the automatic sliding glass doors, paranoia appears. Necks stiffen, hands clutch purses, eyes search desperately for bargains. A trip to the local supermarket is no longer an adventure in good eating; it is a survival test. And in the current food crisis it is the careful eater who is faring worst. Food that is empty of nutrients or loaded with chemicals is cheap; nutritious food is expensive.

During the past few months, reports of record increases in food prices have been accompanied by government advice on how to eat well without consuming your entire paycheck. At a White House news conference, Virginia Knauer, special assistant to the president for consumer affairs, delivered a nine-point "Battle Plan for Saving," including a suggestion that Americans begin eating the hearts, livers, and kidneys instead of the breasts, loins, and ribs of their favorite farm animals. Perhaps the most revolutionary idea came from James D. Maclane, deputy director of the Cost of Living Council, who suggested that Americans "try something that I've tried lately—eat a little less."

Not everyone in the administration has lost his appetite, however. The U.S. Department of Agriculture recently published a helpful guide to cutting meat expenditures without nutritional loss. The report, which appeared in *Family Economics Review*, compares the cost of protein from various meats and meat alternates, at August 1972 prices. Twenty grams of protein, about one-third the recommended daily allowance for most adults, can be obtained from a three-ounce serving of such lean meats as beef, pork, lamb, veal, turkey, or fish. To get that 20 grams from sirloin beefsteak, you will pay 59 cents. The same 20 grams from turkey, however, costs only 22 cents.

Moreover, as the guide shows, not all meats and meat alternatives provide 20 grams of protein in a three-ounce serving. Twenty grams of protein requires six ounces of bologna, ten slices of bacon, one-half pound of pork sausage, or three and a half frankfurters. In dollars and cents this means you pay 46 cents for 20 grams of protein from bologna, but only 19 cents for the same amount of protein from hamburger, even though, on the average, hamburger costs 13 cents more per pound. Actually, the most economical protein sources are meat alternatives like dry beans, eggs, or peanut butter. Four and a half tablespoons of peanut butter, for example, provides 20 grams of protein and costs only 12 cents.



The Department of Agriculture apparently does not see a quick end to the food crisis. The Cost of Living Council agrees. The "rosier outlook" is that price increases will be slower in the latter half of 1973. So if you're not looking forward to a steady diet of peanut butter sandwiches, you can send for a copy of the USDA's report by writing to the Consumer & Food Economics Institute, Federal Center Building #1, Hyattsville, Maryland 20782. □

Patient Etiquette

BY SOLOMON W. GOLOMB

Earlier this year the American Hospital Association published a "Patient's Bill of Rights" [Editorial, SR of The Sciences, *March 1973] that should, according to our author, serve to remind us that there can be no rights without responsibilities. To fulfill this need, he has, in his own words, "modestly undertaken to prepare 'A Code of Ethical Behavior for Patients.'" It reads:*

• DO NOT EXPECT YOUR DOCTOR TO SHARE YOUR DISCOMFORT.

Involvement with the patient's suffering might cause him to loose valuable scientific objectivity.

• BE CHEERFUL AT ALL TIMES.

Your doctor leads a busy and trying life and requires all the gentleness and reassurance he can get.

• TRY TO SUFFER FROM THE DISEASE FOR WHICH YOU ARE BEING TREATED.

Remember that your doctor has a professional reputation to uphold.

• DO NOT COMPLAIN IF THE TREATMENT FAILS TO BRING RELIEF.

You must believe that your doctor has achieved a deep insight into the true nature of your illness, which transcends any mere permanent disability you may have experienced.

• NEVER ASK YOUR DOCTOR TO EXPLAIN WHAT HE IS DOING OR WHY HE IS DOING IT.

It is presumptuous to assume that such profound matters could be explained in terms that you would understand.

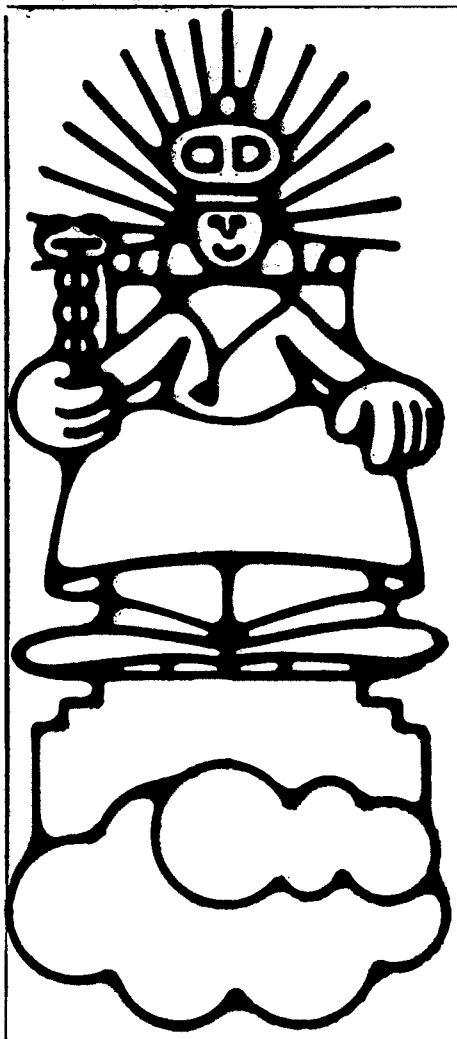
• SUBMIT TO NOVEL EXPERIMENTAL TREATMENT READILY.

Though the surgery may not benefit you directly, the resulting research paper will surely be of widespread interest.

• PAY YOUR MEDICAL BILLS PROMPTLY AND WILLINGLY.

You should consider it a privilege to

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



contribute, however modestly, to the well-being of physicians and other humanitarians.

- DO NOT SUFFER FROM AILMENTS THAT YOU CANNOT AFFORD.

It is sheer arrogance to contract illnesses that are beyond your means.

- NEVER REVEAL ANY OF THE SHORTCOMINGS THAT HAVE COME TO LIGHT IN THE COURSE OF TREATMENT BY YOUR DOCTOR.

The patient-doctor relationship is a privileged one, and you have a sacred duty to protect him from exposure.

- NEVER DIE WHILE IN YOUR DOCTOR'S PRESENCE OR UNDER HIS DIRECT CARE.

This will only cause him needless inconvenience and embarrassment. □

Solomon W. Golomb is a professor of electrical engineering and mathematics at the University of Southern California.

Heard Melodies Are Sweet...

If only the authorities at the Louvre would grant permission, we might hear Mona Lisa speak, or listen to the sounds of the orchestra Leonardo supposedly employed to alleviate his subject's boredom during her long sittings. Science writer Arthur Clarke raised this possibility in a recent Doubleday lecture at the Smithsonian Institution's National Museum of History and Technology. He was talking about capturing sounds that might have been trapped in the drying paint, a technique originated by Dr. Richard Woodbridge.

It all began a few years ago when Woodbridge, a chemist and engineer from Princeton Junction, New Jersey, first recovered sound from an inanimate object by "playing" a clay pot. In this pioneering investigation into recovering sounds of the past, Woodbridge explored the surface of a pot fashioned on an off-center wheel that made a loud bang each time it went around. Using a hand-crafted wooden needle and a phonograph pickup wired to earphones, Woodbridge heard the methodic bang as he revolved the pot. Then, playing a clay pot created on an electric potter's wheel, he claims to have heard a slight hum, presumably the sound of the motor.

In his search for lost sound, Woodbridge also played very loud martial music behind a canvas while it was being painted. Suspecting that the vibrations of the music were captured in the paint when it dried, he reproduced the booms of the drums and a few snatches of melody with his crude phonograph pickup.

Further testing his theory, Woodbridge took to his sound room a contemporary oil painting of the Delaware River. After six weeks of tediously pursuing paint strokes, he found what he was looking for—a spoken word. "I recognized the voice of my artist friend saying 'blue,' and the word was located in a patch of blue sky," said the 56-year-old scientist.

He reported his findings in a letter to the Proceedings of the IEEE (Institute of Electrical and Electronics Engineers) and received mixed responses. "Some people think I faked it, some think I'm a nut, and others think my discovery is wonderful."

Woodbridge hypothesizes that any plastic material can record sound vibrations, but "the trick is to find those sounds and then get them out." The next step, he says, is to work out a way in which the searching can be done electronically or optically, instead of by the laborious manual approach.

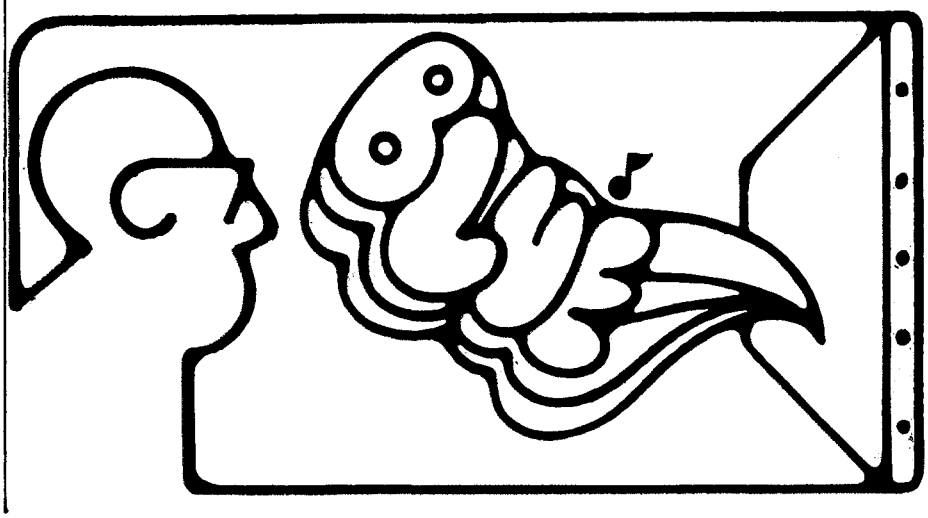
Woodbridge lets his imagination run wild as to applications. "I'd like to hear George Washington and other famous people talking as they had their portraits painted," he says. "All I did was show it could happen." □

The Cause That Lost Its Issue

After making extensive plans to build a nuclear power plant on the northern California coast, Pacific Gas and Electric Company announced earlier this year that it was withdrawing its application to the Atomic Energy Commission. The reasons given were "geologic uncertainties" (the site was located over an earthquake fault) and "uncertainties caused by the passage of Proposition 20" (a state environmental measure passed last November to protect the California coastline).

The surrender by PG&E left opponents of the plant dangling without an issue. In its most recent (and probably last) newsletter, Citizens for Clean Energy, a group organized expressly to do battle with the proposed Point Arena plant, lamented:

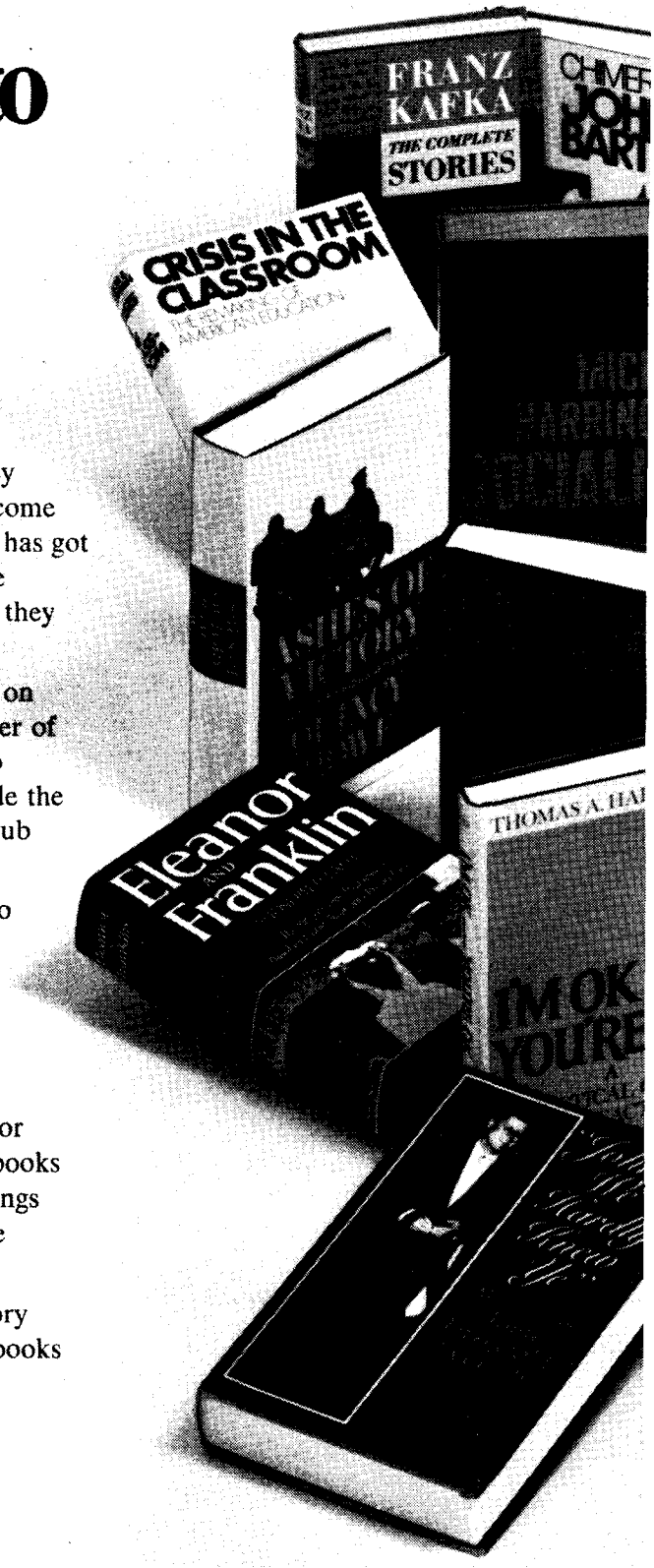
"Our cause has disappeared, but many disturbing questions we have raised remain unanswered, unresolved.... If our neighborhood atomic plant ends up farther away than Point Arena, then we are lucky, perhaps, but we are not off the hook. As citizens



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"You don't "make" the Saturday Review Book Club just because you're a best-seller...

you really have to *say* something!



Some people have the idea that best-sellers and good books are synonymous.

Our editors scoff at such notions. That's why they pour through hundreds of new titles each month to come up with a few outstanding selections. To them a book has got to really say something to be worthwhile. It has to have depth and literary significance, ideas and insights or they won't recommend it to our members.

For instance, take a look at the selections offered on these pages. They're our kind of books and our caliber of authors for our kind of readers. Some are destined to be best-sellers. Some are not. Some have already made the best-seller list. Regardless, Saturday Review Book Club *never* intends to compromise with excellence.

Yes, our books *really* say something. They "talk" to you. And you'll appreciate what they have to tell you.

If you're still listening, you're interested. So why not start your trial membership now by taking any 4 books shown here for $1 (plus a modest charge for shipping and handling). If you check out the listings you can come out with $50.00 worth of superb books for your dollar. As a member you need take as few as four books in the next 12 months. And you'll enjoy substantial savings averaging 20% or more off the publishers' prices on the books offered.

The Saturday Review Book Club. Our introductory offer speaks for itself. But wait till you hear what our books have to say.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Select any 4 books now for just $1

. ELEANOR AND ANKLIN
eph P. Lash
il. Price, $12.50

. SOCIALISM
hael Harrington
. Price, $12.50

. FRANZ KAFKA: E COMPLETE STORIES
l. Price, $12.50

. CRISIS IN THE ASSROOM
rles E. Silberman
il. Price, $10.00

. I'M OK—YOU'RE OK
mas A. Harris, M.D.
l. Price, $5.95

. FLANNERY O'CONNOR: E COMPLETE STORIES
l. Price, $10.00

. CITIZEN NADER
rles McCarry
l. Price, $7.95

. NO NAME IN THE STREET
es Baldwin
l. Price, $5.95

. THE NEW CENTURY DBOOK OF GREEK THOLOGY AND LEGEND
ed by Catherine B. Avery
l. Price, $7.95

. THE MYTH OF THE CHINE: Technics and an Development
is Mumford
l. Price, $12.00

. DESCHOOLING SOCIETY
Illich
l. Price, $5.95

. THE 12-YEAR REICH
ard Grunberger
l. Price, $10.00

. DUCE!
ard Collier
l. Price, $12.50

252. NIXON IN THE WHITE HOUSE
Rowland Evans, Jr. & Robert D. Novak
Publ. Price, $8.95

021. MEMOIRS OF HOPE: RENEWAL AND ENDEAVOR
Charles de Gaulle
Publ. Price, $10.00

637. "JOHNNY WE HARDLY KNEW YE": Memories of John Fitzgerald Kennedy
Kenneth P. O'Donnell & David F. Powers with Joe McCarthy
Publ. Price, $8.95

378. THE PEOPLE'S HANDBOOK OF MEDICAL CARE
Arthur Frank, M.D. & Stuart Frank, M.D.
Publ. Price, $8.95

433. CHIMERA
John Barth
Publ. Price, $6.95

374. THE LONG REVOLUTION
Edgar Snow
Publ. Price, $6.95

618. AMERICA IS HARD TO FIND
Daniel Berrigan
Publ. Price, $5.95

411. ASHES OF VICTORY: World War II and Its Aftermath
Quincy Howe
Publ. Price, $12.50

286. THE ELOQUENCE OF PROTEST
Edited by Harrison E. Salisbury
Publ. Price, $7.95

431. LING: The Rise, Fall and Return of a Texas Titan
Stanley H. Brown
Publ. Price, $7.95

151. C.I.A. The Myth & The Madness
Patrick J. McGarvey
Publ. Price, $6.95

384. COUNTERREVOLUTION AND REVOLT
Herbert Marcuse
Publ. Price, $7.50

477. DRAGON BY THE TAIL
John Paton Davies, Jr.
Publ. Price, $10.00

624. ON LEARNING AND SOCIAL CHANGE
Michael Rossman
Publ. Price, $10.00

533. YOU AND YOUR MONEY
Eliot Janeway
Publ. Price, $5.95

444. SPEARPOINT
Sylvia Ashton-Warner
Publ. Price, $5.95

171. THE N.Y. TIMES EVERYDAY READER'S DICTIONARY OF MISUNDERSTOOD, MISUSED AND MISPRONOUNCED WORDS
Laurence Urdang
Publ. Price, $7.95

086. GEORGE, BE CAREFUL
George Lois with Bill Pitts
Publ. Price, $7.95

526. THE DEATH OF THE ARMY
Lt. Col. Edward L. King
Publ. Price, $6.95

To: **Saturday Review Book Club**
Huntingdon Valley
Pennsylvania 19006

Please accept my application for membership in the Saturday Review Book Club and send me the four books whose numbers I have printed in the boxes below. Bill me only $1 plus shipping and handling for all four.

If I am not delighted with these books, I may return them within 10 days; my membership will be canceled and I will owe nothing.

If I keep them, about every four weeks I will receive the Club's free newsletter describing the forthcoming selection, plus dozens of alternates. If I wish to receive the selection, I need do nothing: It will be shipped to me automatically. If I prefer an alternate, or no book at all, I will notify you by the date specified by returning the convenient form always provided.

I need purchase only four books during the coming year—at savings averaging 20% off publishers' prices. I may cancel my membership any time after these purchases. A modest shipping and handling charge is added to all shipments.

Mr.
Mrs. _____
Miss (please print)

ADDRESS _____

CITY STATE ZIP CODE

1-P04317

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and power users, we are still responsible, still involved, still worried. What to do with this free-floating sense of responsibility and concern is not apparent."

The leaders of Citizens for Clean Energy suggest that members write letters, pay attention to other nuclear controversies, think about alternative energy sources, and "watch out for PG&E's next move." Meanwhile, the money they raised to fight the Point Arena plant rests safely in a savings account—to be used when they find a new cause. □

Sea Serpent Sanctuary

In this day of high competition for the tourist dollar, a canny community learns to publicize whatever it happens to have. What Arkansas happens to have is a history (perhaps mythology would be a better word) of sea monsters; sightings have been reported from Texarkana and Lake Conway, among other places, these past few years.

So, as a result of a resolution in the Arkansas Senate, the state now has the first known sea monster preserve: the White River Monster Sanctuary and Retreat, in the vicinity of Newport, Arkansas. No one is allowed to "molest, kill, trample, or harm" the alleged creature.

Locals have reported seeing large triangular tracks on White River sandbars over the last few decades, but there's no sober testimony of actual sightings. Nevertheless, the citizens are convinced they have a monster, and, apparently, so is their State Senate.

The fish-and-game people aren't quite as excited; according to Game and Fish Commission representative George Purvis, "I don't think there'll be signs erected or anything like that. This whole thing doesn't have much meaning—but you don't say that to a state senator." □

Accommodations In Orbit

BY PATRICK YOUNG

Skylab I, the first semipermanent floating U.S. space station, is not just another capsule. In fact, it is more in keeping with the fantasy ships of Stanley Kubrick. In Skylab's 11,474 cubic feet of working and living space—an area 55 times larger than that of Apollo—there is packed in and bottled on an incredible array of technology's finest hard- (and some not-so-hard-) ware.

The food chests on board no longer are jammed with bland pastes and concentrates. This time the astronauts will dine in style on such earthly dishes as lobster Newburg, German potato salad, asparagus, and strawberries, all prepared in heat-and-eat trays called, in best NASAese, Automatic Meal Reconstitution Modules. After the food has been dropped into special tray holes, the AMRM is plugged in for quick heating. Each crewman dines at a special table equipped with metal thigh restrainers, which keep him from floating away before he gets to dessert. Tableside magnets keep his knife, fork, and spoon from drifting off. Each astronaut sips beverages—including lemonade, orange and grape drinks, cocoa, coffee, and tea—from closed containers equipped with valves that can be sealed or opened with the lips. The tab for each individual's meal runs a sky-high $30.

For relaxation there are books, cards, music on tape cassettes, and binoculars, so the crews at leisure can watch earth through an 18-inch-diameter wardroom porthole. On-board games include a made-to-order Velcro-covered dart board with a dozen Velcro-tipped blunt darts and three standard-size handballs, each wrapped in a nonflammable coating. There are even special book jackets fashioned from nonflammable materials to insure complete fireproofing in the oxygen-rich atmosphere (70 per cent O_2, 21 per cent nitrogen).

The lab's interior decor is hospital modern—subdued whites, grays, and creams—with handrails on the bulkheads and overheads for taking three-dimensional walks. Should any crew member need to perform a test that requires him to stand on the floor for a length of time, there are triangular-shaped inserts in appropriate places that match receptacles in the soles of the astroshoes. A slight swivel motion of the heel locks the astronaut to the floor, while a reversal of the motion frees him.

Each crewman gets three-fourths of a gallon of water for a weekly shower in a collapsible stall, but, thanks to NASA's ingenuity, this thimbleful goes a long way in space. The water is sprayed from a pressurized bottle, and the washing sequence has been virtually choreographed in a precise spray-soap-wash-rinse-dry cycle lasting 25 minutes. Since there's no gravity to pull the water down a drain, it is sucked up by a vacuum hose hanging inside the stall. Before the spaceman crawls out, he must vacuum each spot of water to keep it from escaping and floating about the lab like an errant raindrop.

Instead of sleeping side by side on contoured couches, as did the Apollo crews, the Skylab astronauts will have small, private bedrooms with cots opening from the bulkhead. That's a comfortable enough place in space, where neither up nor down exists. The astronauts merely have to zip themselves in at night to keep from floating around.

The main section of Skylab has been adapted from the third stage of a Saturn 5 rocket, the type used to carry the Apollos to the moon. Attached to Skylab are a docking device, an airlock, and the Apollo Telescope Mount for solar observations.

The space station, scheduled for launching May 14, will be manned by three shifts of astronauts for 28, 56, and 56 days. During the 140 days of planned flight, the nine astronauts will accumulate considerable trash: about 1,150 cubic feet of soiled towels and clothing, food remains, packaging, wrappers, cans, and other junk. Skylab's designers are prepared, however: all waste material will be sealed in teflon bags and hurled into an unused oxygen tank from the rockets. As the pundits will be sure to point out, Skylab, once its final crew departs, will end its days circling the earth—perhaps the most expensive garbage can in the universe. □

Patrick Young is the science writer for The National Observer.

Madding the Crowd

It's one thing when your friends turn against you, but quite another when your playthings do. Charles Bovill, chief engineer of Allen International, a British company that makes bugging and night-seeing devices, has modified ordinary discotheque sound and light effects and come up with an insidious anti-riot weapon.

Instead of strobe lights and music, Bovill's device emits nearly ultrasonic sound and infrared light flashing at a frequency of about 15 times per second. It has been known for some time that light flashing at a critical frequency can trigger unpleasant reactions in some people's central nervous systems. The dual beams of Bovill's machine are virtually invisible and soundless, yet when they are aimed at a rowdy crowd, 5 per cent of the group suffer epileptic attacks and another 25 per cent experience feelings of nausea, lightheadedness, and fainting. This is enough, Bovill says in an article in the *New Scientist*, to induce panic and disperse the rioters. Only one bug to be worked out in the photic driver, as the device is called: right now it is effective only at night. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Harper's introduces

THE THREE-MINUTE EGGHEAD

(portrait of the new know-nothing)

He reads the book review and claims he's read the book . . . a film review is sufficient to judge the work . . . pop and op clutter his halls . . . and fancy bindings gleam from the walls.

Harper's is not for him. No way, because culling the superficial yields even more superficial thinking.

INTRODUCING THE HARPER'S READER. YOU?

He's turned on and tuned in to the best reading in America. So he reads *Saturday Review*, and books—lots of books—and *Harper's Magazine*.

Why? Because he knows that it takes brains and guts, talent and time, faith and skepticism to produce a great magazine every month.

It takes the *same* virtues to read it, to understand it, to heed its constructive criticism. It takes a lot for this *quid pro quo*. YOU, FOR INSTANCE?

Perhaps you pride yourself on having an open mind. But do you have it? *Really?*

You like intellectual challenge, stimulation, the inner pleasure of a new thought —however alien. But if it questions (with intelligence, perception, and understanding), if it *really* questions some of the basic "truths" you hold as self-evident, will you admit the thought?

If so, then you'll enjoy the new *Harper's*.

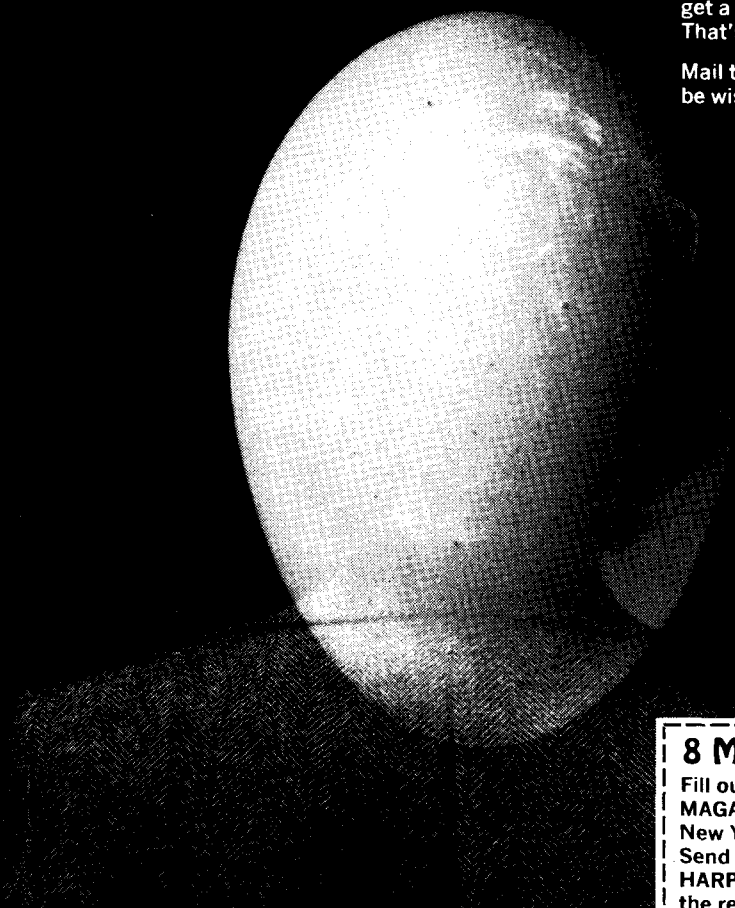
AND WE'LL MEET YOU HALFWAY

The editors want to help you *make* sense out of what's making news. And the publisher will pay half the freight if you'll go halfway too.

The coupon below can bring you the next eight months of *Harper's* for only $2.84, payable later if you like. That's half the regular subscription price for the same eight issues.

Try it. If you don't like it, cancel and you'll get a full refund for all unmailed copies. That's a promise. And a guarantee.

Mail the coupon today. Tomorrow you'll be wiser for it.



8 MONTHS ONLY $2.84

Fill out and mail today to HARPER'S MAGAZINE at 2 Park Avenue, New York, N.Y. 10016
Send me the next 8 months of HARPER'S for only $2.84. That's half the regular subscription price and $5.16 off the newsstand price.

☐ Double my savings. Send 16 months for only $5.68

☐ Payment Enclosed ☐ Bill me

Name_____

Address_____

City_____

State_____ Zip_____

182 for new subscribers only

Harper's Magazine

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

TRAVEL

This Is a Vacation?

BY EDWIN DIAMOND

Adrienne Jamieson, a first-year student at Wellesley College, was working at a summer job in the planetarium in Mystic, Connecticut, when she decided she wanted some "actual field experience" in astronomy . . . .

Thomas and Marianne Witherby are a fiftyish couple; he is an amateur photographer; she is a veteran traveler who prefers "to track something down" when she travels . . . .

Professor Donald Menzel of Harvard is one of the world's leading astronomers; like many other scientists these days, he has been feeling the knife of federal cutbacks in research funds . . . .

Normally, personal contact between professional scientists like Menzel and "civilians" like Adrienne Jamieson and the Witherbys would arise only by chance—if, for example, their luggage got mixed up at New York's John F. Kennedy International Airport. But now, because of the efforts of a new, nonprofit group called Educational Expeditions International, located in Belmont, Massachusetts, professional scientists and willing amateurs are deciding to join forces in the summer vacation season to do scientific field research. In a brisk, *quid pro quo* arrangement, the scientist provides the experiment and the support team, and the civilians supply the research funds and the manpower. EEI is the middleperson, skimming about 25 per cent of the total cost of an expedition for overhead and promotion.

Last July, for example, Adrienne Jamieson and Thomas Witherby were among a group of 54 people who accompanied Professor Menzel to Prince Edward Island, Canada, to help record a solar eclipse. Others in the group included an art teacher, a New York City street light worker, and a man who claimed he was a coffin salesman.

Menzel wanted to photograph and observe the outer solar corona, but, as one of his EEI assistants recalls, he wasn't sure how to use amateurs to do it. He split the group into a dozen photographic teams and assigned each team specific emulsions and shutter speeds on the theory that at least one team would get everything correct. But, with all the cameras in position, eclipse

day was overcast—a sort of replay of "Ready when you are, C.B."—and some phases of the experiment were clouded out, though the group did manage to get usable measurements of the corona. Jamieson says the experience was "fantastic—it was amazing how the people all worked together." And Tom Witherby says he's looking forward to future EEI trips.

Educational Expeditions International is the result of a collaboration between Robert Citron, 40, a Smithsonian Institution administrator, and Clarence Truesdell, 43, a former Smithsonian associate who is now superintendent of schools in Jacksonville, Vermont. The EEI idea grew from Truesdell's belief that "there is an amazing reservoir of talent in the average person—if properly motivated." For Truesdell the professional-amateur expeditions realize an educational vision, by giving the average person an opportunity to work in the field with a high-level scientist, to learn from him, and "to be part of a scientific event."

In past years being "part of a scientific event" has meant that some gifted amateurs have bounced across eastern Zambia on a Land Rover to the Kalemba Cave, where they unearthed a deposit of Middle Stone Age tools estimated to be 30,000 years old. They also proved that two different types of stone tools made between the Middle and Late Stone Age were the result of an indigenous transition, not an invasion of outsiders. In two weeks the novices had accomplished an assignment that might have taken an ordinary scientific expedition months to achieve.

It was a new experience—in education and travel. "We call it 'traumatic education,'" Truesdell says, "the kind of educational experience that changes your perspective and stays with you for the rest of your life. An education all the textbooks in the world can't give you."

Truesdell and Citron—and the other EEI officials—often sound like scoutmasters showing camp slides of last summer's "learning experience" to prospective little scouts and their parents. The earnest tone of EEI's catalog ("Each expedition is an intensely personal experience. . . .") and the chatty EEI Newsletter ("Larry Hershfeld writes that his near-severed thumb is just fine . . . . Barbara Keener has signed up for the Mauritanian expedition next June . . . .") are easy targets for satire. So, for that matter, is the educated American's eagerness to "make something" of his or her leisure time. As Citron puts it: "People today are looking for a new way of expressing themselves—they want to spend their time creatively in something that enables them to grow inside."

To a jaundiced eye, EEI trips often do seem like summer camps—and for the well-to-do at that. Marianne Witherby's trip to Greece last summer, to participate in the underwater explora-

Edwin Diamond, a featured commentator on the Post-Newsweek TV stations, is a visiting lecturer at MIT.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

At left, geologist Bruce Nolf and EEI field workers on Baltra in the Galapagos Islands. Below, EEI participants examine an Iron Age burial pot in Zambia, and divers off Bermuda map the remains of a Spanish galleon.

tion of the ancient Spartan seaport of Gythion, cost about $1,275 for 18 days in the field—plus air fare. According to Mrs. Witherby, her group lived at a luxury hotel—opened by the Greek government in advance of the season for their arrival. Though the amateur archaeologists were long on enthusiasm, they were short on experience. "Out of 30 people," she recalls, "only the leader, Dr. Niki Scoufopoulos, and her assistants had had any underwater archaeological experience at all." A good deal of time was lost while the amateur divers were being instructed not to bring back to the surface everything they found. ("They acted like they were on a treasure hunt," said one participant.) The archaeologically correct procedure is to mark potential findings with a buoy.

Director Citron acknowledges that the trips are relatively expensive. The problem, according to Citron, is not enough participation. Scientific expeditions that include a stiff dose of mental and physical labor for several weeks aren't for every tourist. An expedition may cost anywhere from $5,000 to $50,000 and require a dozen or so participants to break even. Despite the high cost, Citron claims that the program is not designed only for wealthy people. "One woman took out a mortgage on her house to go," he said, "and two-thirds of the participants earn from $10,000 to $15,000 a year, which shows that it's a type of experience that ordinary people want." It is a chicken-and-egg situation: costs per person are lowered when more people apply, but more people don't apply because the cost per person is high. To try to break the cycle, EEI has had to advertise (which, again, keeps expenses high). But the advertising campaign, the enthusiasm of the EEI staff, and the sometimes ecstatic endorsements of both the scientists and the amateurs have begun to get the EEI idea off the ground: in 1971 there were four pilot trips, in 1972 there were eight expeditions, and this year no fewer than 20 expeditions are planned. Dr. Phillip Tobias, a close collaborator of the late Dr. Louis Leakey and head of the anatomy department at the University of Witwatersrand, South Africa, will lead a July expedition to South Africa to survey the ape-man caves of the Transvaal. Dr. Gerald Hawkins, the astronomer and author of *Stonehenge Decoded* and *Beyond Stonehenge* will lead an EEI expedition to "megalithic Britain." EEI reports it received some 150 requests for grant applications from scientists for expeditions in 1973. "We receive the proposals at a rate of two or three a week," says Citron.

The EEI staff takes care to make sure that the field research has scientific merit and is not just a ripoff. The chief scientist of the expedition, for example, agrees by contract with EEI to make all necessary arrangements with local and/or national authorities for the trip, select a staff of assistant scientists, select the expedition coordinator, make preparations for the logistical support of the expedition, prepare and conduct daily lectures, group discussions, and briefings, involve EEI participants in the work and research of the scientific team, prepare an expedition plan, prepare an expedition budget, select one or more scholarship students from local schools and universities of the host country to accompany the expedition—and publish the results in a scientific journal within two years of the termination of the expedition. In return EEI selects and organizes the team of participants, does advance publicity work, and assists the scientists in advance logistical arrangements. Quite sensibly, EEI does not serve as a travel agency. Participants make their own arrangements to get to Greece or Bermuda or Ethiopia or Kenya, where they are met by the EEI crew.

Despite all the planning, some EEI trips cannot be foreseen. "Last year we mobilized an expedition within 24 hours to an erupting volcano in Iceland," says Citron. "We heard of the eruption and made phone calls to ten previous participants—seven said they'd go. The expedition was led by Dr. Paul Mohr from the Smithsonian and included two other scientists, Dr. Carl Einarsson of Columbia University and Dr. Ian Gibson of the University of London. We were in the field on the third day of the eruption." The team collected lava, estimated the volume of volcanic ash, and photographed the erupting volcano. The preliminary chemical results were published two weeks after the expedition.

Some of the participating scientists still have private doubts about the real research merit of EEI expeditions, especially when they seem as much geared to sunshine and socializing as to science. But at least one scientist got on so well with the amateurs that he is reportedly planning to work with them again this summer—without the sponsorship of EEI (the breakaway group may be able to conduct the expedition at less cost if they organize it themselves).

Perhaps the experience of geologist Paul Mohr is instructive, if not typical, of the scientific safari idea. Mohr led the 1971 EEI expedition to the Amaro Mountains in southern Ethiopia, where the group mapped and surveyed unexplored areas. This year he is leading a trip to the Simien Mountains, the range sometimes called "the roof of Ethiopia." When Citron approached Mohr with the EEI idea and asked him whether he'd like to lead a group, Mohr recalls that he wasn't sure at first. He said he thought the EEI principle was sound but wondered how amateurs could contribute in his work. "In archaeology, for example, they can be taught quite readily how to dust off artifacts, but geology requires an intuitive sense of observation learned after years of training . . . ." But Mohr decided to try the Amaro expedition, because it allowed him to do research at a place that he wouldn't normally be able to afford. Mohr led a "complete spectrum" of participants: an M.D., a woman from Michigan "who had never seen a hill before," some "young fellows" who had just come into inheritances. They discovered some uncharted tributaries to rivers (Mohr and his team went to the natives, obtained the names of these tributaries, and put them on the map) and encountered tribes who had never seen Caucasians before.

Could scientific safaris grow to become a significant new direction in research? The idea, with all its imperfections, has obvious appeal, stirring visions of the university without walls, of science without government bureaucracies. It would be a welcome relief—to taxpayers, at least—if more ways could be found to draw civilians (their energies, as well as their money) to the support of real scientific labor. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LETTERS

Letting Well Enough Alone
The travel articles about "Unspoiled Places" [*SR of The Sciences,* April] were very interesting, but they all emphasized traveling to these *unspoiled* places. Why are these places still unspoiled? Obviously it is because the mainstream of touristry has not yet reached these last frontiers of unspoiled beauty. I am in favor of leaving the unspoiled places as they are, and I was particularly pleased with the comment you received from B. F. Skinner, who said, "If I did know of an unspoiled place, it would be a great mistake to publish it in *Saturday Review,* would it not?"

David Alwin
North Freedom, Wis.

Back to Basics
Dr. Markowitz's concern over the appearance of his babies' belly buttons ["Belly Button Blues," *SR of The Sciences,* April] is of some interest, but it is certainly not an example of a physician's attunement to women's liberation. Clearly, men's concern over the correct stereotyped appearance of women is not a new phenomenon. My guess is that the same men who notice a protruding belly button at an "exclusive beach" would also find hair on women's legs appalling. Women need to learn to accept and understand their natural bodies. It would be a lot easier if men would consider this acceptance their problem as well.

Sandra Kay Smith
Portland, Ore.

The Encounter Phenomenon
Jane Howard's review of books dealing with the efficacy of encounter groups [*SR of The Sciences,* April] raises a question that dates back to the banishment of Adam and Eve for eating from the Tree of Knowledge: Is blissful ignorance better than disturbing knowledge? The encounter phenomenon poses the question in a new fashion, inasmuch as the enlightenment disturbing to the 10 per cent "casualties" of encounter groups is that of *self*-knowledge. The question is moot, of course, so that to denigrate the movement on the basis of so-called casualties is unwarranted. Since my encounter experience I am a contentment casualty, but a personal growth victor. Frankly, I like the exchange.

Wesley Miller
Assistant Professor, Education
Queens College
Flushing, N.Y.

Sifting Out Scientific Significance
Frank Kendig correctly analyzes the massive outpouring of published material dealing with the sciences and suggests some remedies in his editorial "Drowning in Data" [*SR of The Sciences,* April]. But all is not necessarily lost, and even trivial or redundant data may have its place. People are discovering how to handle overcommunication and the increasing stacks of publications. Most published material consists of derivations or amplifications of a fundamental truth, and we discover fundamental truths only rarely. The "synthesist" that Frank Kendig proposes, therefore, need not be a superman—just one who can sift out much chaff, one who can recognize a significant concept when he sees one. Isaac Asimov seems to have mastered this ability. So have quite a number of science reporters and writers.

Richard W. Schmelzer
Secretary Emeritus,
Rensselaer Polytechnic Institute
Clearwater Beach, Fla.

A Giant Step for Entomologists
In the interest of science and to promote further study of the flat-footed fly ["Flat-Footed Flies," *SR of The Sciences,* April], may I suggest that entomologists simply use a mirror in the same way that a dentist examines that upper molar. It is much cleaner and less exhausting than the "head-in-a-hole" procedure.

Charles E. Bess
Flat River, Mo.

Slightly Askew
The article "A Pyramid Askew" [*SR of The Sciences,* April], about the accuracy of the construction of the pyramids of Egypt, was interesting, but the mathematics was also slightly askew. At a radius of 100 feet, a separation of 5½ minutes of arc would be slightly less than two inches, not "about ten feet," which would be correct for 5½ *degrees,* not minutes, of arc. The writer was off by a factor of 60.

Carlos A. Greenleaf
Inverness, Fla.

Sorry, our mistake.—THE EDITORS

Computers May Monopolize Monopoly
I was somewhat amused yet intrigued by Irvin Hentzel's article "How to Win at Monopoly" [*SR of The Sciences,* April]. I have no doubt that your computer system of playing the world-famous game would produce positive results. With all of the helpful pointers, however, the enjoyment of the contest would be totally lost trying to recall them. For computers this technique of play is appropriate; but for the average human to take full advantage of this advice, I'm afraid we'll have to wait a few years.

James D. Long
Philadelphia, Pa.

Hard Times for the Modern Chicken
Ralph Ernst describes in his article "The Egg and You" [*SR of The Sciences,* April] how hundreds of chickens are bred and fed in huge plants. Not only are these animals deprived of sunlight and fresh air, but they are denied the biological function of hatching their own eggs. I can suggest no alternative method to meet the demand for eggs, but maybe one of the great scientific minds bent on increasing quality and production can think of a way to do so without making the chickens part of their machines. What next? The greedy poultryman sees an opportunity to crowd three layers of chickens into an enclosure that has so far housed two. This bit of business administration acumen adds up to twice as many eggs per 168 square inches of wire mesh with only a one-third increase in feed costs. Who can lose with an Alice in Wonderland type of genetic engineering like that? What this country needs is a bill of rights for chickens!

Karen Ratzan
Belleville, N.J.

Joseph Schneider
Bloomington, Ind.

Dropping a Hint About Eye Drops
There are many times when a little bit of the wrong information can do a great deal more harm than none at all. The inclusion of "eye drops" and "eye cup" in the list of medical items in your article "The Well-Stocked Medicine Chest" [*SR of The Sciences,* April] is one example. What sort of eye drops did you mean? Anesthetic? Antibiotic? Steroid? Glaucoma medication? Atropine? Or simply the generally useless over-the-counter preparations? And what do you intend be treated with these drops? An abrasion or an infection, or iritis, or only an itch? It's one thing to say "keep an eye drop available," but quite another to know what is wrong with an eye and to use a medication that not only will help but won't create new risks. I would suggest that you either be more specific or delete that piece of advice.

Philip Lempert, M.D.
Ophthalmologist
Fellow of the American Board
of Ophthalmology
Ithaca, N.Y.

Chilling Facts on the Country's Cooling
If a new great Ice Age is indeed on its way, as many of James Hays's facts seem to indicate ["The Ice Age Cometh," *SR of The Sciences,* April], what can we do to live with it? Or can we? Will the equatorial belt suddenly pulse with a heterogeneous northern population? Can we construct walls around Manhattan? Invent nuclear melting devices to save the prairie breadbasket? Mr. Hays's article is provocatively chilling but leaves me rather unsettled. Perhaps a second article is in order to instruct us how to cope with the Ice Age once it in fact cometh.

John R. Kolkmeyer
Bloomington, Ind.

Alarming News
The Russians are coming, the Russians are coming. The article "A Trans-Alaskan Tube" [*SR of The Sciences,* April] should alert all Americans to the fact that Communism is much closer than we think. I, for one, had no idea that Siberia was only 50 feet from Alaska, via the Bering Strait.

Evelyn Hackwright
New Orleans, La.

No need to man the missiles; it's our mistake. The Bering Strait is actually 50 miles, not 50 feet wide.—THE EDITORS

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

EDITORIAL

Hercules vs. the Hydra

This guest editorial was written by Reid A. Bryson and John E. Ross, director and associate director of the Institute for Environmental Studies at the University of Wisconsin. Dr. Bryson specializes in global climatology; Dr. Ross, in environmental studies.

If the environmental movement had a birth date, it was probably April 22, 1970—E-Day, celebrated widely around the country. As infants go, it was a lusty one, almost full-grown from the start.

Some now say that the original environmental movement has already entered senescence, that pollution, now recognized, is less of a threat. What *really* matters, they say, is the energy crisis: "Energy," proclaimed *Forbes* magazine recently, "is about to replace ecology as the pet of Washington politics."

This is quibbling. By changing the nicknames, we are creating the illusion of change, of progress even. Whether the crisis is labeled "pollution," "ecology," or "energy," there are strong-flowing forces moving through our society, of which the visible crises are merely symptoms. These forces can be ignored only at our peril.

Many people have proposed solutions to the problems. Some exhort us to return to a simpler lifestyle and a subsistence economy. Others advocate narrower, more specific remedies, such as recycling bottles and cans, eating "natural" foods, and restraining urban sprawl. Along with these proposals have emerged groups that promise to lead us out of the wasteland of environmental problems. Such groups offer us plans wrapped in technology or ecology or an elevated environmental consciousness.

Some of those who advocate one cause or another now have begun to realize that their cause is not the only one, or even the fundamental one. Scientists who have taken the trouble to quantify some of our activities, for example, can show quite handily that "technology" or "population" or even "pollution" cannot alone account for the seriousness of our predicament; this realization may explain the relative quiescence of environmental groups today, compared with a few years ago.

Indeed, the immensely complex nature of the predicament accounts for the number of people who hope that "the government will take care of it." No sooner does a local conservation group force through a town ordinance banning the sale of phosphate-bearing detergents, for example, than these well-meaning citizens are informed that the *real* problem is phosphates in fertilizers, or that the replacement in detergents is worse than phosphates, or that carbon, not phosphorus, is really the "limiting factor" in the nearby body of water. What the hell, say the conservationists; if the scientists can't guide us better, why should we campaign and parade only to look ridiculous after a false victory?

Why, indeed? For one thing, the problems are real; those dead fish really do smell, and one must do something. The frustration that is besetting so many activists is akin to that attributed to Hercules as he wrestled with the Hydra. New problems seem to bloom after every pollution solution.

Here is the essence of the dilemma: an isolated remedy—cleaning a smokestack, restricting cars in a national park, blocking construction of a power plant—does for the environment about what an aspirin does for a headache—it blocks the pain, but it has nothing to do with the causative mechanism. A central equation ties the various environmental issues together: people × resources × technology=the state of the environment. Such "environmental problems" as pollution, for example, are not isolated "causes" of the "crisis" but symptoms of an unbalanced equation.

The development of the "throwaway" mentality illustrates how this interaction causes problems. If 100 people per square mile use 100 bottles each per year, of which 70 per cent are throwaways, then the bottle pollution is 100 (people) times 100 (bottles) times 70 per cent, or 7,000 bottles per square mile per year. Stated more abstractly, pollutant production per square mile per year is equal to the number of people per square mile times the annual resource use per capita times the fraction of this resource dumped into the environment.

The problem is simpler than the cure, however. Do we reduce the number of people or the bottles they buy or the proportion of them that is thrown away? Technology has made throwaway bottles *seem* cheap, so consumers happily chuck them toward oblivion.

They do not get there, of course, and they are not cheap in environmental terms. Throwaway bottles cause solid-waste pollution and must be replaced. When aluminum cans are considered, the throwaway habit becomes even more expensive: a ton of aluminum costs about 56,000 kilowatt hours to mine and refine, not counting fabrication and transportation.

There are many ways to upset the people-resources-technology balance. We switch from high-sulfur coal to natural gas because of air pollution—only to find there is little gas left in the world. In demanding more energy sources to raise our standard of living, we find that we must import petroleum; it is reasonable to argue that our dollar problems *vis-à-vis* other countries' are related to our dependency upon imported energy. We raise GNP and pollution at the same time; in Russia, dust falling onto the Caucasus Mountains has varied in proportion to capital input into the economy.

The product of the people-resources-technology factors obeys a law of equilibrium in natural communities, where animal populations are balanced by competition and predation. Likewise, plant growth is limited by soil resources and solar energy input. Man alone is ignoring the second law of thermodynamics, which, loosely interpreted, implies that there is no free lunch. If we do not learn to balance our people-resources-technology equation, there will soon be no lunch at all. For example, if the rest of the world used petroleum at the rate we do, the proven world reserves would last about seven years.

The last 20 years have been described as the golden age of science, featuring increased federal funds and remarkable progress in many specialized areas, from molecular biology to computer hardware. In that era, however, science failed to attack the problems that cross disciplinary boundaries—such as pollution. While our institutions developed superb techniques for training specialists, they practically ignored the interdisciplinary approach—perhaps the only way to deal with the problems caused by such an adaptive, widespread, and aggressive creature as man.

REID A. BRYSON AND JOHN E. ROSS

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

THE EVOLUTION OF MENACE

With the switch from brawn to brain, man developed sophisticated ways of threatening his rivals. Yet, like his primate brothers, he can still intimidate with a sneer or glare.

BY R. D. GUTHRIE

WHY DO PEOPLE REACT differently to men with beards than to men without them? What is the function of underarm hair in *Homo sapiens*? What's so "manly" about John Wayne? Why do humans grin, grimace, sneer?

For centuries such questions were not considered biological, and, as a result, many parts of the human body were an enigma to anatomists. There were no obvious biological reasons why humans have pubic and underarm hair, eyebrows, visible whites around their irises, beards, long head hair, or hair that grays with age. Now, however, it appears that the anatomists were asking the wrong questions. These anatomical features serve social functions rather than enhancing an individual's chance of survival. The beard, for example, seems to have developed as a way for adult males to intimidate each other.

In order to understand why we have inherited such social characteristics, it is helpful to consider evolutionary trends and to examine the way similar characteristics function in other animals. The study of ethology (how animals behave in the wild) has yielded a great deal of information, much of it providing startling insights into our own behavior. One important generalization drawn from ethological data is that *Homo sapiens* is not the only "social" animal. Evolutionary success (or "fitness") depends as much on *social interactions* (the ability to cope with your fellows) as on the ability to cope with the physical environment. So, most vertebrate species have some form of social hierarchy or pecking order. The hierarchy structures take varied forms in different species, but in each a great deal of behavior centers on the hierarchy. As a result, animals have evolved myriad ways of communicating their status to other members of their group. How they have done so can be understood through the process of natural selection.

Within a breeding population the mere survival of an individual has no evolutionary significance—what counts is the number of reproducing offspring he sires. Those individuals that contribute the greatest number of descendants to the population have the greatest effect over time. Selection is thus a cumulative process.

In a population with a social hierarchy, choice of territory and nesting sites, access to food, choice of mates—all the factors that determine who will have the greatest number of offspring—are affected by an individual's rank. Thus, any feature that enhances an individual's rank will tend to have a positive selection value. Gradually, over a long period of time, these features will develop greater and greater refinement.

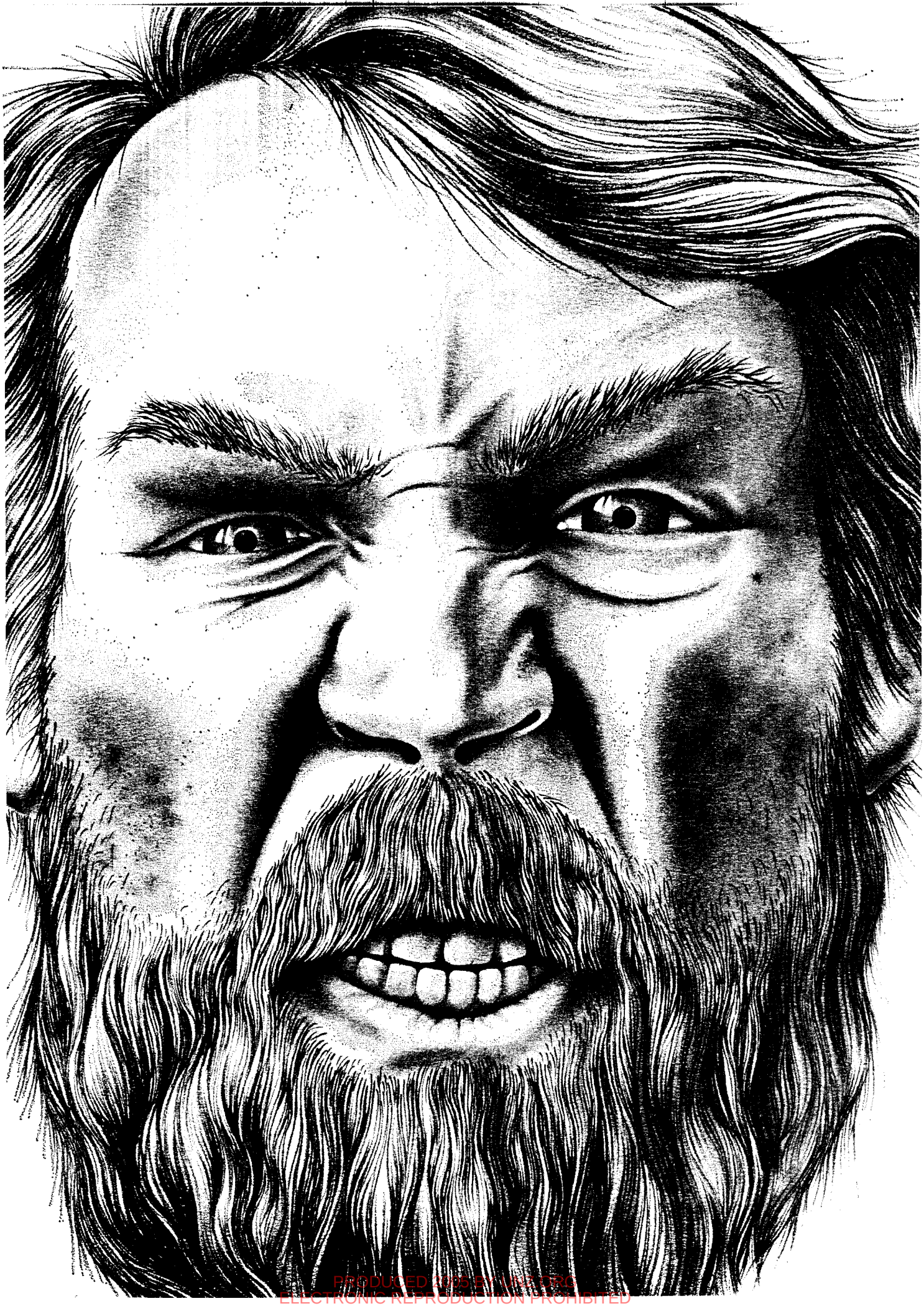
The most successful way of achieving high rank is through intimidation or threat. Ethologists use the term *threat* to refer to those behavior patterns that signal an animal is about to attack. A dog, for example, lays back its ears, bares its teeth, and growls. Most of the time, however, the outcome of a fight is settled simply by a

In our social interactions we have some not-so-subtle ways of expressing ourselves, a few of which are even inherited. The behaviors, for example, add menace to the already threatening face at right.

R. D. Guthrie is professor of zoology at the University of Alaska in Fairbanks.

Illustrations by John Hyatt

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

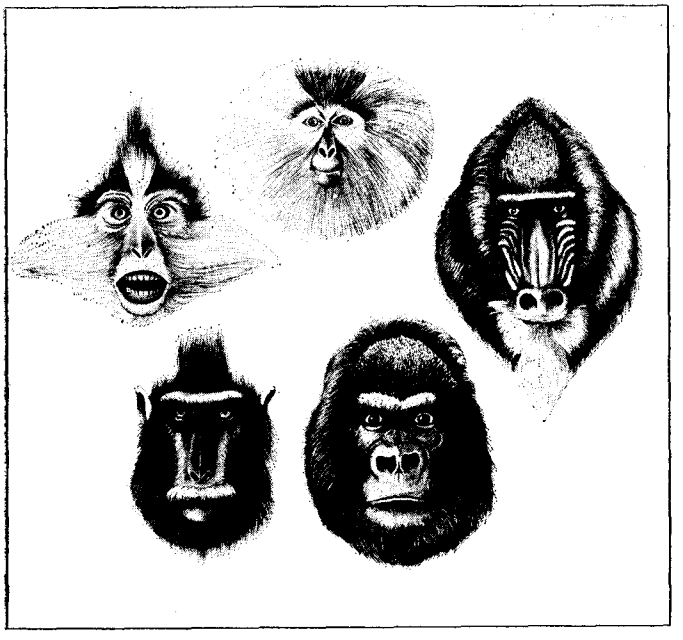


PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

show of strength and confidence; no actual fight ensues. The animal displaying the most strength and confidence is the winner. Thus, most threat displays have as their main function the communication (and determination) of status or rank.

Actually, there appear to be two main types of display features that are found throughout the animal kingdom: those that affect social rank and those that affect sexual attraction. One of the mistakes made by many biologists in the past was to assume that secondary sexual characteristics affect only sexual attraction. Some do, but most don't; they affect social rank instead. Sexual attraction is primarily affected by the male's rank, which in turn is achieved by the male's aggressive display characteristics.

Ethological data shows that some threat features dramatize and exaggerate an animal's capabilities while others act to camouflage weaknesses. There are advantages and disadvantages to both concealing and revealing emotions. This is one of the major questions humans face almost hourly—just how much of ourselves should we expose to others? There are social advantages to being "open"—it is necessary in alliances and in some aspects of courtship—but status can often be increased by hiding weaknesses.



Various types of facial hair patterns are found in primates. Clockwise from top left: the black-crested mangabey, the crab-eating monkey, the mandrill, the gorilla, and the Celebes black ape.

Compare, for example, the social strategies of wolves and foxes. Wolves are extremely social and have a complex communication repertoire. The wolf (and his domestic counterpart, the dog) is an expressive animal. Foxes, on the other hand, are rather solitary, and a confrontation between two adversaries is a study in hidden emotion.

Humans have faced many of these same conflicting pressures for social transparency and opaqueness. As social animals, it is usually to our benefit to be emotionally expressive—particularly when we are young. But adult males of most species (including *Homo sapiens*) are "concealers"; they have the most status to lose. The strong male is judged to be the one who never shows weakness, who expresses little if any emotion.

To illustrate the idea that parts of the human anatomy are related to threat-display features in other animals, it will help to examine several human features and show how they function today.

The Beard and Chin

Most mammals fight either with their mouths (fangs and tusks) or with their heads (horns and antlers). These weapons play an important role in threat displays but have supporting structures that are equally important. Deer, for example, display their *necks* when they confront each other. Although antler size and weight are important, it's the neck that provides power; all else being equal, the animal with the strongest neck wins the fight. Thus, relative neck size is an important consideration when two deer clash. Knowing this, we can understand the function of the social decorations associated with the necks of deer: neck size is exaggerated either by a swelling of the neck muscles or by the growth of a thick neck mane. The mane is usually in a color that contrasts with that of the rest of the body, which dramatizes the neck.

A clean-shaven, round chin softens the effect of the face. Also, the eyes and eyebrows are relaxed, making the expression benign but not submissive. The face obviously is still capable of menance.

The same principle applies to beards. It appears that one of the important trends in primate evolution was the clearing of hair from the face. This trend seems to have occurred simultaneously with the expansion and specialization of the facial muscles. The increasing dependence on the face as a means of visual communication is surely the basis of both trends. Although the loss of facial hair is an interesting process in itself, there remains the question of why some patches of hair remain in certain areas of the human face and body.

Primates are biters, and although humans are somewhat of an exception, tooth displays still form part of our social interaction. (Ethologists have traced the development of the human grin, grimace, and sneer back to the basic primate tooth display.) Some biters—wolves, felines, and baboons, for example—not only display their teeth but, in addition, show off the size of their lower face. Thus, in many species the jaw muscles are exaggerated with a face ruff, or beard.

The argument that beards are threat-display features becomes more compelling when it is noted that beards

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

appear only on adult males. In most primates, features used in threat displays are sexually dimorphic (i.e., they appear in one sex but not in the other). It is also common in species with sharply defined hierarchies for young or juvenile males to be near the females in rank. Since most serious confrontations over rank occur among sexually mature males, there is a tendency for features of intimidation to appear in males at puberty, but never in females.

It seems, however, that the human beard is on the evolutionary decline. When our ancestors began to throw things at each other and fight with clubs, threat-display features began to have less direct meaning. Nevertheless, chin size and shape still figure strongly in our gut evaluations of people. Strong jaws or weak chins are symbolic of status (toughness) or the lack of it. Interestingly, next to face lifts and hair transplants, silicone chins are among the most sought-after forms of plastic surgery by males.

The Mustache

The mouth is an important center for visual as well as auditory expression. The term "weak mouth" is not without meaning: it describes a very expressive, flexible, flimsy-lipped mouth. The "tight-lipped," thin-line mouth of a John Wayne or a Richard Boone does not have the potential for showing weakness.

What then is the function of the mustache? Considered as distinct from the beard, in its untrimmed, unwaxed state it is a veil that hides mouth expression, a localized mask that produces a social profile of strength by concealing potential expressions of weakness. Like beards, coarse, full mustaches are the property of adult males—the sex and age group that experiences the strongest status pressure in most species.

The Eyes

Among the features that primates use for communication, the eyes are at least as important as the mouth. The "intense stare" is used not only by primates but by the majority of other vertebrates as a means of intimidating others. It probably originated as a preliminary to an attack or a charge. As we all know, stares can be menacing indeed. And the reverse, the avoidance of eye contact, is the height of submissiveness or subordination—"He can't look me in the eye."

There is a striking difference between the eyes of humans and those of other primates, however. Humans alone have exposed sclera (the white of the eye). In the rest of the primate world, only the pupil and iris are visible. Thus, it seems that one of the major factors in the evolution of sclera in humans has been a refinement of the eye's role in communication. Because of the exposed sclera, for example, humans have the uncanny ability to determine the exact position of a person's stare or glance from a distance.

Aside from the intense stare, humans use their eyes to communicate a wide variety of feelings. The exact meaning of a look is largely contextual; a fleeting glance can be just that, or it can be considered evasiveness or shyness, depending on the situation. The type of eye contact reveals the quality of attention humans are directing toward one another as well as something of their attitudes toward each other.

What is particularly interesting about human eyes is their variation in size and shape. In some human groups there has been a tendency to revert to a less revealing eye—the "Mongolian" fold—which appears to be the result of highly complex social selection pressures. These variations result in predictable behavior reactions when two groups meet—to the wide-eyed Westerner the oriental face is inscrutable."

The Eyebrow

The eyebrow, like the feature it complements, is more than an intimidation device. The eyebrow can add considerable threat to a stare, but just by shifting the angle of the brow, the expression is completely changed. It seems likely that the eyebrow and its forerunner, the bony brow ridge of our ancestors, did evolve as threat devices. And the eyebrow seems to work on the same principle as does the beard: it gives the underlying structure a more massive appearance.

In the case of both eyes and eyebrows, their versatility as social communicators has resulted in little sexual dimorphism: both men and women have more or less the same features. There is, however, a slight tendency for females and children to have larger eyes with more of the whites exposed, and their eyebrows tend to be thinner, with finer hair strands.

Graying

Ethologists working with baboons, gorillas, and a number of other mammalian species have shown that one of the important badges of rank is a gradual color change in the pelt that occurs with age. In virtually all species, status is highly correlated with age: the older the animal, the more experience it has; the larger it is, the more strength it has (until it becomes senile). A young Hamadryas baboon, stumbling upon a frosty-coated old male, immediately recognizes that he's in the presence of an "elder." Individuals profit as a result. The young animal avoids the wounds of defeat, and the older one doesn't

Stripped of its mustache, the fu lipped mouth los all trace of mena The lifted eyebro and averted eyes underline the sul missiveness dis- played in the fac

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The Aggressive Use of Personal Space

WE REACT not only to how people look and the expressions they wear but also to how far from us they are. A menacing visage will instill little fear if it's 30 feet away, but let a person jut out his jaw two inches from your nose and it's another matter entirely. Distance, too, can be used to communicate.

Imagine yourself encased in an invisible balloon. When you stop to chat with a friend or climb into a crowded bus or whisper into your lover's ear, the boundaries of the balloon expand or contract to meet the situation. The distance you maintain between yourself and others in each of these encounters is deeply ingrained and very much a product of your culture. It is your personal space.

The use of personal space is learned, not instinctive, and is only part of a complex repertoire of nonverbal language. In normal conversation, for example, Englishmen maintain a wider space between each other than Americans do, while the space between Frenchmen or Arabs is markedly less.

The use of personal space adds nuances to everyday interactions between people. Normally, we would not consider shouting a secret to a friend or whispering in a stranger's ear. Instead, when speaking confidentially, we lean much closer to the other person than is normal. If we lean close and shout, the effect is threatening.

How personal space is used aggressively can be illustrated by two simple experiments.

- The next time you chat with a friend (someone who is the same sex as you), try closing the space between the two of you. Moving closer to your friend will involve overcoming your own feelings of discomfort at the action—but watch your friend back off. He or she may even become so disturbed by your action that further conversation is impossible.
- As another experiment, try hogging an empty table in a cafeteria or library. Pick a table located in the center of the room, sit in the middle facing the door, and stare at all who approach. Other tables will fill before yours.□

have to waste energy in defending his rank.

Our attitudes toward our fellow humans also seem to change with hair graying. Silver tresses or white temples are symbols of social seniority. There is every reason to believe that the graying of human hair evolved and functioned in the same way as the silver back of an old gorilla or the frosty mane of a baboon.

Skin Texture and Odor

Although it has been underemphasized in the natural history literature, the major means of social intimidation in mammals is scent. The strength and kind of odor indicates sex and age—the all-important ranking cues. Most mammals have two separate scent markers: defecation odors and small, specialized patches of skin loaded with glandular tissue that secretes a smelly, mucous material. In the latter there is an overlying tuft of hair near the gland, which serves to incubate and disperse the odor. Odors commence or are strengthened at sexual maturity and generally gain potency with age.

Like it or not, we too are endowed with such glands. Their locations are readily discernible from deodorant ads—in the armpit and the crotch. These apocrine glands, however, do not function until the individual reaches puberty—a child needs neither deodorant nor thorough scrubbing to avoid smelling.

These glands play a major role in one's sense of well-being. Our self-evaluation and self-assuredness is higher in familiar surroundings, and as a result, confrontations, in any species, are more likely to be successful for an individual in a familiar setting. We are all a little more insecure and uneasy away from home. If, during a confrontation, an antagonist can overwhelm you with an unfamiliar sensory impression, he will probably gain the upper hand. So most mammals, including humans, exude a strong scent during times of stress, bombarding their opponent with their own individual body odors.

The beneficial effect of washing on health is more myth than fact—washing is primarily a social-appeasement gesture.

This is true of skin care as well. The texture of our skin changes with age, although the amount of change seems to vary among individuals and groups. Skin generally becomes coarser after puberty and, if not carefully scrubbed periodically, gets an oily, greasy surface. This serves to highlight its coarse texture, particularly on the face and the frontal part of the scalp.

The Socialized Animal

Because of deodorant sprays and soaps, humans seldom get the full olfactory effect of months without bathing and, since the advent of the razor and scissors, have rarely been faced with the hairy veil of an untrimmed mustache or beard. Why have we modified ourselves so far from our "natural" state? Surely it is because a dense society of relative strangers would function poorly if these threat signals were constantly on display. Humans lubricate their social interactions by mimicking prepuberty juveniles as much as possible: we shave our faces, underarms, and legs deodorize and powder our skin. Juveniles, after all, have a protected place in all primate societies, including our own.

The irony is that the uniform of the "flower children" in the 1960s—the "natural look"—had unintended consequences. The flower child generation took on attire and grooming habits in opposition to "straights," but rather than symbolizing peace, as some intended, they actually flaunted the age-old status and intimidation features. Our society has so adorned itself with all the trappings of friendly social interaction that the flower children had no other option.

Our reactions to these ancient signals are deeply ingrained. True, they vary widely—hair pattern and texture, scleral exposure, skin color and texture, nose shape, breast shape, and buttocks shape all differ among human groups. But such variation is common among vertebrates. Just look at any field guide for the distinguishing features of subspecies of birds and mammals. They are such characteristics as head-color patterns and horn size or shape.

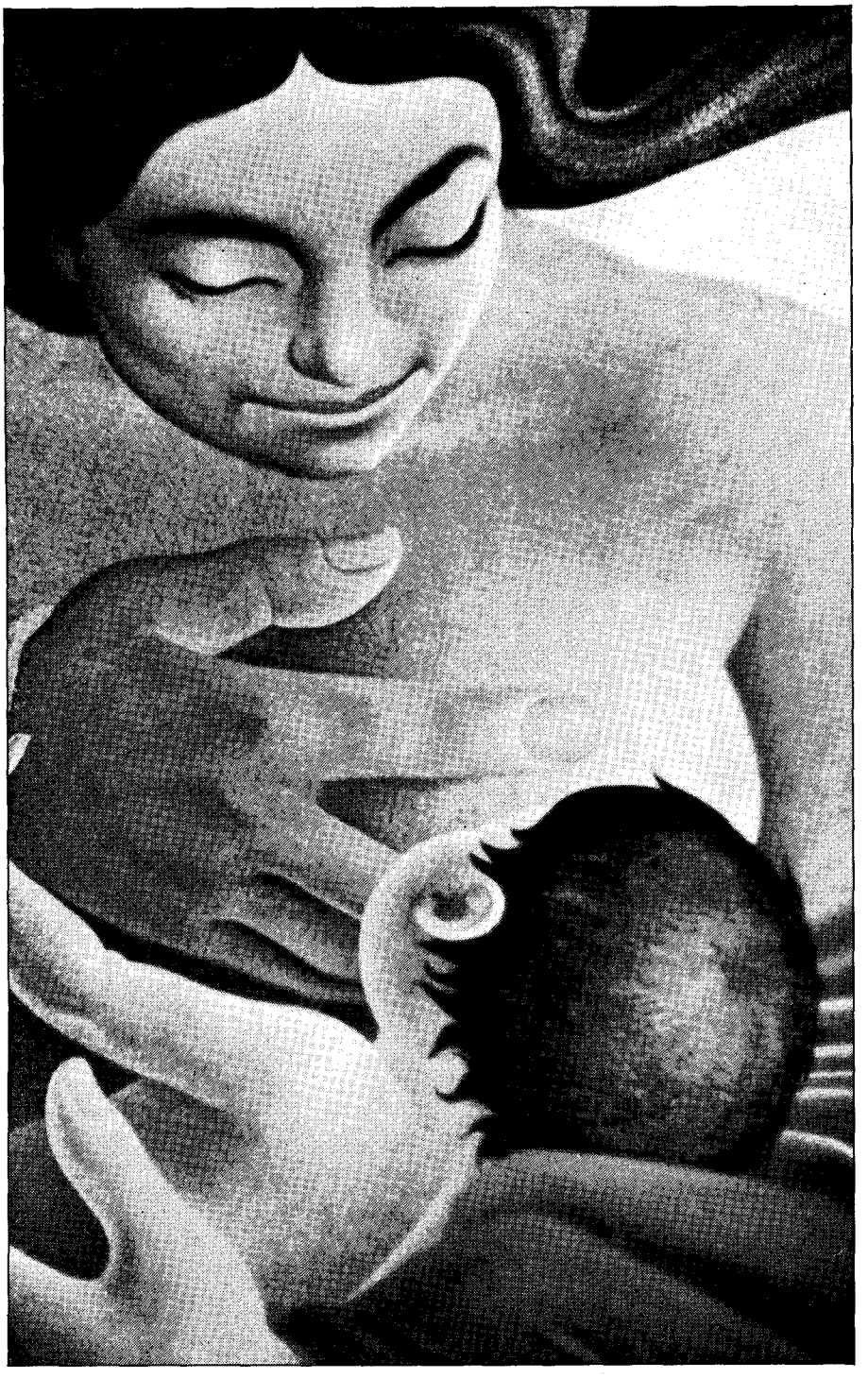
There are a number of things that, theoretically, can affect the evolution of social or threat features. Interactions with the climate or with other species in the surrounding environment, availability and use of resources, and, most importantly, social organization. Selection, after all, ultimately depends on who lives to bear the most fertile offspring. Anything that affects net reproduction rates over the long term will leave its mark. For many centuries human populations were virtually isolated and developed varying traits in conformity with their culture and environment.

In comparison with other primates, it appears that the main evolutionary trend in human threat displays has been to increase their flexibility. In social groups, cooperation is imperative, and the group has the power to discriminate against offensive individuals. As the necessity for more subtle forms of aggression came about, the fixed intimidation features must have been selected out. Furthermore, humans have language—far more subtle and flexible than the best visual feature. Today we tailor the intensity and form of intimidation to match each particular situation.

Still, threading through our lives, reflected in our standards of beauty, and despite all cultural vicissitudes, there are the same organic signals humans have used since time immemorial. And they will probably remain for centuries to come.□

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

THE ECONOMICS OF BREAST-FEEDING



WITH THE RAPID SPREAD OF THE BOTTLE HABIT, THE LOSS OF MOTHER'S MILK CONSTITUTES A NATURAL-RESOURCE CRISIS.

BY ALAN BERG

IF THE WELLS of an oil-producing country in Asia or Latin America were to go dry, warnings of catastrophe would quickly erupt. Yet a comparable crisis, involving loss of a natural resource worth hundreds of millions of dollars, is occurring virtually unnoticed in many of the world's poor countries. The resource is human breast milk, and the loss is caused by a dramatic decline of maternal nursing in recent years.

The decline is in some ways surprising, since breast-feeding is the traditional and ideal form of infant nutrition, usually capable of meeting all of a child's complex nutritional needs for the first four to six months of life. For most infants in low-income countries, prolonged breast-feeding may be the key to survival, affording the only ready source of high-quality protein containing all the essential amino acids. These infants are now being offered more expensive and less healthful substitutes, resulting in worldwide human and economic suffering.

Historically, human milk has been revered as the only true means of infant feeding. The Koran prescribes that "mothers shall suckle their children for two years." In ancient Egypt, nursing commonly was continued for three years, and in biblical Israel for two years. A Spartan royal law of the fourth century B.C. required mothers to breast-feed their babies, and Caesar ridiculed Roman mothers who retained wet nurses for their children. Early Indians believed that the longer a child received breast milk, the longer it would live. It was not uncommon, therefore, for children to be suckled until the ages of eight or nine years. As recently as 40 years ago, Chinese and Japanese mothers nursed their children as long as 5 and 6 years, Caroline Islanders up to 10 years, and Eskimos up to 15 years.

The more man learns of nutrition, the more apparent it becomes that breast milk is in many ways the perfect food. As Oliver Wendell Holmes said, "The breasts were more skillful at compounding a feeding mixture than the hemispheres of the most learned professor's brain." Breast milk meets most of the metabolic needs of the baby during the months essential to normal brain development. Furthermore, the unbalanced or inadequate diets that often replace mother's milk tend to contribute to illness late in life. Although breast milk alone is inadequate after about six months, it can, when supplemented

Alan Berg is presently a nutrition planner with the World Bank. This article is adapted from The Nutrition Factor, *copyright 1973 by the Brookings Institution.*

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

by solid foods, continue to be of great value for many more months.

Natural milk also provides a host of protective factors. Breast-fed babies are more resistant to malaria and to infection caused by bacteria or viruses (including the polio virus). They are less likely to suffer from rickets or iron-deficiency anemia. The role of colostrum, the yellowish fluid that comes from the breast after childbirth and before the beginning of milk flow, is becoming clearer—and more obviously crucial. It appears that colostrum protects the child against infections, particularly those of the intestinal tract, and against food allergies. This explains why allergies are more common in artificially fed babies.

Some advantages are even more obvious. The milk is easily digestible. Furthermore, it requires no preparation: the rural West African mother, for example, commonly conducts her business—even striding along carrying a basket on her head—while a youngster perched on her back feeds from her long, pendulum-shaped breasts stretched to the side.

Why should such an extraordinary product fall into disuse? New social values, spread through urbanization and faster communications, make breast-feeding in many places seem an old-fashioned or even vulgar peasant practice. Indeed, anthropologists in some countries even measure the level of acculturation by the incidence of artificial nursing—the less nursing, the higher the sophistication level. In most developing countries the bottle has become a status symbol. This trend in the poorer countries is apparently a reflection of behavior in the wealthier ones. A continuing nationwide study in the United States found that in only ten years the number of mothers breast-feeding when they left the hospital had declined by half. This drop is most pronounced in the poorer states, such as Arkansas.

Although there has been a resurgence of interest in breast-feeding in the United States, it has been largely confined to the college-educated and the well-to-do. In the Boston area, breast-feeding was found to be nearly twice as prevalent among upper-income families as among lower-income groups. Middle-income mothers in New York and San Francisco were six times more likely to nurse than lower-income mothers. Similar declines have been described in Great Britain, Australia, Sweden, and Poland. The stigma against nursing, with its unfortunate consequences, is one of the values unwittingly communicated to the less-industrialized countries.

The stresses of modernization also contribute to lactation failure. A common anxiety in our changing environment is a mother's worry about her ability to breast-feed. While at least 85 per cent of all women have the physical capacity to nurse for six months or longer, psychological blocks often interfere with the letting down of milk. In an examination of Indian women, over 80 per cent in the highest socioeconomic group were unable to breast-feed for as long as six months, while among the lowest socioeconomic classes such failure was practically unknown. "Social and cultural factors and their physiological and emotional accompaniments," according to a study in rural India, "were far more important determinants of lactation performance than dietary and nutritional factors."

visits, attend public shews, and spend the night at their beloved cards." Finland went so far as to assess penalties on non-nursing mothers whose children died during the first six months of their lives. In Britain a decline in the weight and height of infantry recruits forced a reduction in the minimum height requirement from five-foot-six to five-foot-three in 1883 and to five feet in 1900; subsequent questions raised in Parliament led to a nationwide campaign to encourage breast-feeding. In the United States, La Leche League, 16 years after its formation, now has 1,220 groups promoting maternal nursing.

The depth of the current crisis has been revealed by our research over the past few years. The tonnage of breast

Mothers in Ecuador line up for expensive packaged foods.

Changing social attitudes regarding the body—particularly worship of the breast as a sex symbol—reinforce the trend. Some women fear that breast-feeding will ruin the shape of their breasts. In parts of Africa, where less than a generation ago women rarely wore upper garments, photographs of bare-bosomed women are now banned. Chinese women in Singapore wear tight bodices to hide their curves, producing atrophy of the breast and depressed nipples. Nursing in public, a common sight a decade ago in most parts of the developing world, is rapidly disappearing as a result of a new public modesty.

The world's governments have suffered nursing crises before. France printed propaganda posters during the 18th century to combat high infant mortality related to a vogue against breast-feeding. According to a pediatrician at the time, "Ladies of quality did not breast-feed so they could have more time to dress, receive and pay

milk produced by humans dropped sharply during the last two decades. Twenty years ago, for example, 95 per cent of Chilean mothers breast-fed their children beyond the first year of life; by 1969 only 6 per cent did so, and only 20 per cent of the babies were nursed for as long as two months. Potential breast milk production in Chile in 1950 was 57,700 tons, of which all but 2,900 tons were realized. By 1970, 78,600 tons of 93,200 potential tons were *un*realized. The milk of 32,000 cows would be required to compensate for the loss. In Kenya the estimated $11.5 million annual loss in breast milk is equivalent to two-thirds of the national health budget, or one-fifth of the average annual economic aid.

The pattern is worldwide. In Singapore between 1951 and 1960 there was a drop from 77 per cent to 42 per cent of children in low-income families breast-fed for at least three months. By 1971 only 5 per cent of Singapore ba-

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

bies were not weaned by three months of age. The estimated money loss through the nonuse of mother's milk for babies under a year old was $1.8 million. In the Philippines 31 per cent fewer mothers nursed their babies in 1968 than had a decade earlier; the $33 million waste that year, in terms of animal milk or milk substitutes that had to be purchased, was nearly twice the $17 million wasted in 1958. In Colombia, as breast-feeding of babies from birth to 11 months declined sharply in the 1960s, milk imports soared; in 1968 they were seven times greater than the 1964–67 average.

In most low-income countries, breast-feeding persists in rural areas. Its abandonment is primarily an urban phenomenon, often not so much because urban mothers work as because bottle-feeding is considered more sophisticated by city dwellers. In Guatemala 98 per cent of rural Indian babies continue to be nursed after their first birthday, compared with 57 per cent of urban children. In Indonesia the comparable figures are 90 and 70 per cent. In Taiwan nearly all rural mothers breast-feed their offspring for six months, compared with just over half of their urban counterparts.

The economic implications of the crisis become clear when these charges are translated into dollars. A child who is nursed through the first six months of life receives about 375 liters (396 quarts) of breast milk. To replace this with the nutritional equivalent in cow's milk—about 437 liters—would take about $65 out of the family income, which, in many countries, is only a few hundred dollars per year. A laborer in Uganda may need to spend as much as 33 per cent of his daily wage for baby's milk; in Chile, 20 per cent; in Tanzania, 50 per cent. For packaged dried-milk formulas, which are rapidly becoming more popular in the food stalls of local bazaars, the cost would be close to $140. These costs do not include waste or diversion to other members of the family or the expense of bottles, artificial nipples, cooking utensils, refrigeration, fuel, and, perhaps most important, medical care, which is frequently ten times greater than for breast-fed babies.

The estimated costs of breast milk losses would be somewhat lower if the additional calories recommended for a lactating mother were taken into account. Unfortunately, however, poor women in poor countries seldom get an enlarged diet during lactation. Generally, the milk is satisfactory for the infant even without extra food for the mother, but the child's need is met at the expense of the mother's tissue.

The concentration of bottle-feeding in urban areas is especially alarming because in developing countries cities are growing far faster than rural populations. In addition, as communication techniques improve, city habits and lifestyles have increasing influence on rural societies. In rural Mexico the decline in breast-feeding is already being felt; between 1960 and 1966 the percentage of babies under six months of age who were fed only breast milk fell sharply in one community that was surveyed.

Roughly 87 per cent of the world's babies are born in the developing countries, about a quarter of these in urban areas. If a fifth of these urban mothers do not breast-feed, the loss in breast milk is $365 million. If half of the remainder of urban mothers do not continue to breast-feed after the first six months, the total loss reaches $780 million. Furthermore, by our best estimates, these figures far understate the situation; losses to developing countries more likely are in the billions.

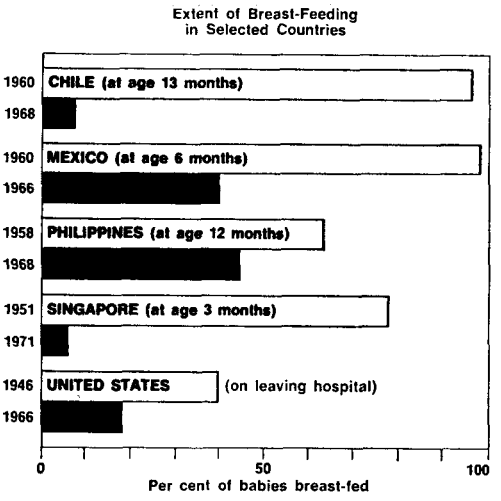
In terms of national development, lactation has another major economic asset—its link to family planning. In many societies, in fact, breast-feeding may constitute a more effective form of contraception than the haphazard and ineffective techniques in practice.

One recent study reported that the incidence of pregnancy in the first nine months after childbirth among non-nursing mothers was twice that of mothers who breast-fed, including those who simultaneously used other foods. In the lactating mother, menstruation and ovulation may be delayed from ten weeks to as long as 26 months. The contraceptive value of lactation is most effective if in the early months the infant receives only human milk, for the sucking stimulus appears to inhibit ovulation. In Taiwan scientists estimated that lactation has prevented as much as 20 per cent of the births that would have occurred otherwise. In India the same ratio would mean prevention of approximately five million births each year.

In some areas of the world where breast-feeding is regarded as essential to a baby's survival, social custom limits sexual intercourse for lactating women, thus reinforcing the link between breast-feeding and contraception. Women avoid intercourse for as long as one year after giving birth in parts of India, for two years in New Guinea, and for 27 months in Nigeria. In some societies the taboo reflects the belief that intercourse will dry up the

In the United States, La Leche League counsels women for whom breast-feeding is unfamiliar.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



This emaciated child received only an inadequate bottle diet.

milk flow or even poison the milk. In areas of South Africa, if a baby dies it is assumed the mother has ignored the taboo, thus killing her baby with "bad milk."

Infant health is closely related to nursing. In poor areas, babies that are not breast-fed often are fed with cheap brews of barley or cornstarch mixed with water. Milk "formulas," when offered, are often mixed with contaminated water in an unclean bottle with a crusty nipple. A study in Chile found that 80 per cent of the bottles examined had a high bacterial contamination. Poor parents usually cannot afford sustained purchases of commercial milk and learn the habit of diluting it (in Lebanon by an inadequate rice fluid costing half a cent per kilogram). In Chile half the mothers receiving milk from the National Health Service were found to be using it incorrectly. For these reasons bottle-fed infants have illnesses, especially diarrhea, more frequently, more severely, and earlier than breast-fed babies. Diarrhea was found to occur ten times more frequently in a group of non-breast-fed Mexican children than in a group of breast-fed children. In Liverpool, England, the rate of gastroenteritis among bottle-fed babies in 1943 was over 12 times that among breast-fed infants.

As breast-feeding dropped off over the past two decades, the average age of youngsters suffering from severe forms of malnutrition also dropped—in some countries from 18 to 8 months. In rural India, where breast-feeding is still predominant for infants, severe protein-caloric malnutrition generally is found less frequently among those under one year than between one and two. However, among Indian immigrants in south Trinidad, this condition is much higher in the first year than in the second, and nutritionists believe that the turn away from breast-feeding is responsible. Since malnutrition in the early months of life is most critical to brain development, this lowering of the average age of incidence of nutritional diseases takes on special significance.

The mortality rate among the bottle-fed is also much higher. According to a San Salvador study, three-quarters of the infants who died from the end of the first through the fifth month had been breast-fed less than 30 days, if at all; a similar study in Recife, Brazil, gave the same results. Also, diarrhea-associated deaths of children in Recife, only 22 per cent of whom were breast-fed for at least one month, were nearly three times the rate in Kingston, where the corresponding figure is 73 per cent.

The world is in urgent need of an information campaign on behalf of nursing, conveying the stark facts about illness and death among non-breast-fed babies in low-income countries. In many such countries officials are uneasy about public discussion of such matters. Fortunately, the gradual introduction of even the most intimate subjects has proven possible. India, where contraception was not long ago a subject fit only for medical circles, is now blanketed with family-planning propaganda, and people of all social strata are discussing birth control. More public information and in some instances government regulation are urgently needed to fight the high-powered advertising of infant formulas, which might be called "anti-nutrition education." For instance, in Latin America many mothers are persuaded by clever advertising to feed their infants cheap cornstarch mixtures that look like milk.

Apparently, campaigns can make a difference. A year after Minneapolis initiated an educational effort in 1920 to increase breast-feeding, infant deaths, which had averaged 772 a year for the previous three years (and more before that), plunged to 65. After the campaign 93 per cent of mothers were nursing for at least three months, and 80 per cent for seven months. The campaign was replicated in Nassau County, New York, with comparable results.

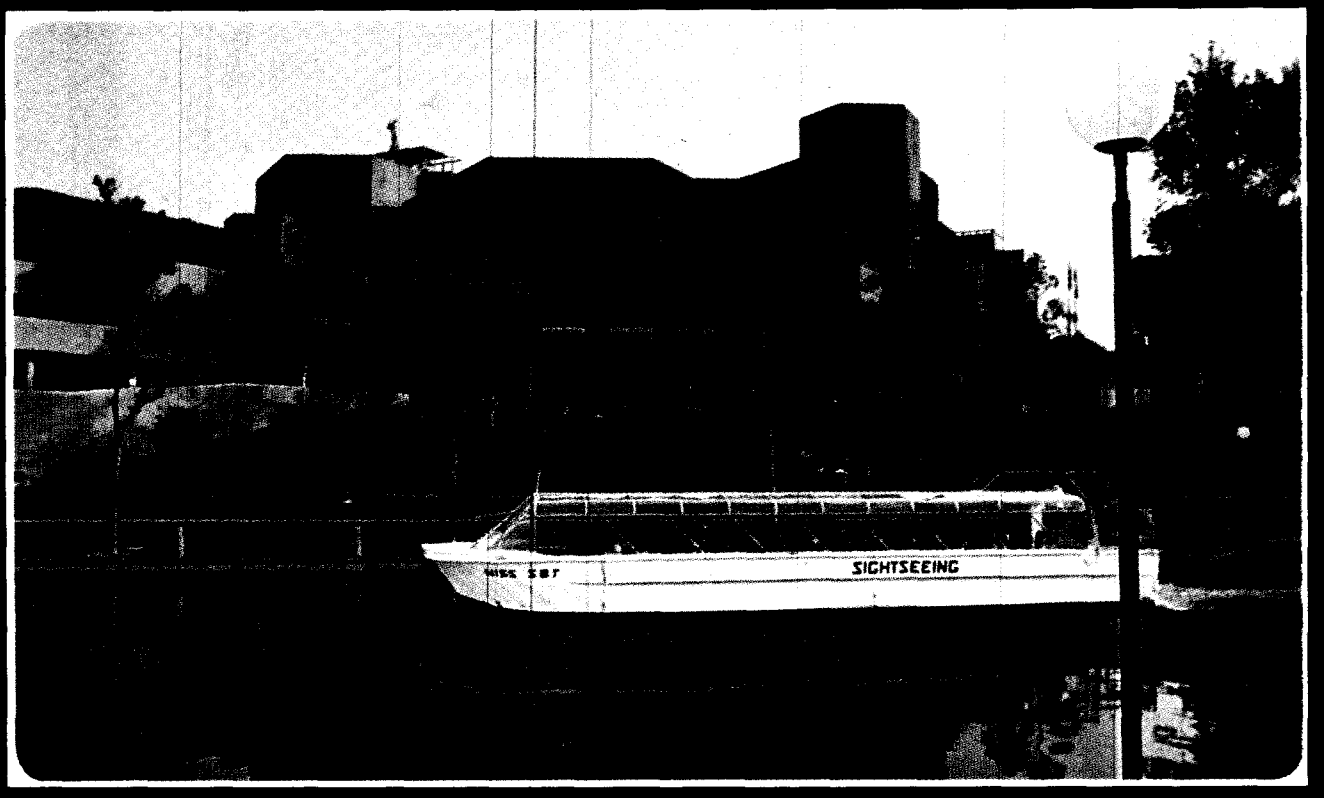
Governments should offer more nursing incentives to mothers. Just as they build bus stands and public rest rooms, so they might provide small structures for nursing mothers in crowded downtown areas or at places of work. In the Soviet Union a four-month maternity leave is guaranteed to ensure that a mother has time to establish a breast-feeding routine before she returns to work; when she does return, the baby receives care and company in a nursery at the place of employment, and every three hours the mother may take a nursing break. In Switzerland mothers receive cash bonuses for nursing their children for at least ten weeks. This practice began in 1911, when only 43 per cent of Swiss women nursed their young and the mortality rate for non-breast-fed children was twice that of those that were nursed. The incentive apparently had the desired effect until the last decade, when, amid rising affluence, according to one Swiss health official, "the breast-feeding allowance was no longer able to fight against the present trend, which consists of not breast-feeding."

Countries that should be concerned with the decline in breast-feeding—many of them unaware of the economic losses they are suffering—are acting slowly, if at all, and often in the wrong direction. Free milk programs, for example, especially those that offer dry skim milk, tend to discourage breast-feeding. The Chilean government during the last ten years has increased twelvefold the free milk available to infants; during this time breast-feeding has declined markedly, and infant mortality in urban areas has risen. Like governments, educational authorities generally neglect the importance of nursing, often emphasizing instead the importance of artificial feeding. Of the 1,600 pages in the major U.S. textbook on pediatrics, only one and one-half concern breast-feeding.

Whoever is to blame for the dramatic decline in breast-feeding in low-income countries, especially in the teeming cities, it represents a staggering loss to those nations both in high mortality and morbidity rates and in outright economic loss. The all-but-silent disappearance of such a major resource must be counted a catastrophe on a global scale. For the vulnerable infant and young child, a reversal of the current trend could be of greater significance than any other form of nutrition intervention. It is surely strange that while scientists explore such exotic forms of protein as bacteria and pond weed, the most biologically adapted, consumer-tested home food for infants is neglected because of indifference and inadequate understanding. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Cities of the North



Maybe you think Ontario is only a land of trees and lakes and rivers. But settled among the trees, beside the lakes and rivers are our cities, and just in case you haven't heard, Ontario cities are exciting places to be.

Like Ottawa, Canada's capital, the cleanest, greenest city in North America. Or Toronto, where you can visit Ontario Place and see the world's largest film on the world's largest screen. Or take the kids to the Science Centre where they can pilot their own lunar landing vehicle.

As for the adult pleasures of Toronto or Ottawa or Hamilton or any Ontario city, ask anyone who's been. They'll tell you the cities of the north are unhurried, unworried, safe, clean, happy, and that's the best advertisement there is.

For information write: Adventure Vacations, Queen's Park, Toronto.

Ontario/Canada

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

PowerPlants & Cottontails

BY BRUCE WALLACE

AN ENVIRONMENTAL IMPACT REPORT was recently left on my desk. Idly I thumbed through its 200 or so mimeographed pages—maps, charts, tables, diagrams, and much officialese. The report had been prepared in fulfillment of federal regulations governing the construction of nuclear power stations. As I flipped the pages, I saw diagrams of water discharge nozzles; my eye picked out such words as "cottontail rabbit," "alewife," and "chipmunk." Curious assertions surfaced from the text: The danger of contamination of milk by Iodine-131 is not sufficient to worry about, but in any case there are no dairy herds near the site of the proposed plant.

Flipping pages is, with me, a reverse process, because I start from the end. At last I approached the front matter—Foreword, Table of Contents, and Summarized Cost-Benefit Analysis. I paused to read the summary because of my unfamiliarity with these studies. As I now recall, the summary analysis consisted of three "benefits" and four "costs." Benefits: 1) the production of 3,000 megawatts of electrical power; 2) the injection of $800,000 into annual regional payrolls; 3) an annual contribution of $4 million to local property taxes. Costs: 1) 45 acres of currently unused land for plant construction; 2) usurpation of 100 acres for additional transmission lines; 3) the dumping of some 700 pounds of salts per day into Lake Ontario; 4) the exposure of local populations to a level of radiation equal to 7 per cent of that which they now receive from natural sources.

That was it. I reread the summary once more, searching in vain for something profound, for a shred of evidence that the report's authors were emotionally moved by, or that they stood in awe of, the task that had been assigned to them. None was to be found.

Now, 3,000 megawatts of electrical power is about one-fifth of the generating capacity of the entire United States in 1930, or one-tenth the capacity in 1940. In the face of such magnitude what does the cost-benefit analysis consist of? Local salaries and property taxes on the one hand, 700 pounds of salt per day on the other. Inside the report, not summarized, are the cottontail rabbits, the chipmunks, and the alewives. Oh, yes, and an explicit surmise that persons will continue in the future to demand television sets, electrical appliances, and air conditioners.

Shouldn't an environmental impact statement look beyond the local rabbits and chipmunl

In my estimation, a report of the sort left on my desk is incredibly inadequate. In a sense, I expect reverence from a group of human beings who are assessing a power plant that is the equivalent of one-tenth of 1940 America. I expect them to look, or appear to be looking, one-tenth of the way to Los Angeles in a search for possible impacts. On the other hand, I am humble in knowing that those who compiled the report are fallible human beings making a living by doing the best possible within the confines permitted by their superiors. Would I have done better in their position? Not likely. The urban sociologist Jane Jacobs has described her frustration in working with zoning officials; because she cannot accept their basic premises, she is incapable of offering them sane advice. And I make this confession now: I would be a useless member of an environmental impact study group.

Can anyone seriously believe that the generation of 3,000 megawatts of electricity will have an environmental impact that is limited to less than 200 acres of land? Suppose that I am asked to prepare an impact statement concerning the use of my automobile. I shall anticipate the effects of starting it, pressing down the gas pedal, and throwing it into gear so that it rushes recklessly from my driveway at top speed. In preparing my report, am I to count and describe the gravel stones

Bruce Wallace is a professor of genetics at Cornell University.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

in my drive, to identify the stunted weeds that grow here and there among them, to study the numbers and habits of the ants and beetles that scurry back and forth in search of Lord knows what? Am I to prepare a report that claims on the cost side that three pounds of gravel will be disturbed as the rear wheels spin? That several hundred small pebbles may be irretrievably lost when thrown into the neighbor's lawn? That there will be some destruction of the wildlife inhabiting my driveway but that the number of casualties involved should be small? That the populations are expected to recover quickly? Do I speak of the children at play in the park across the street? Of the residential area beyond the park? Of the shattered lives of those persons my car may strike if it runs amok?

It seems to me that the creation of 3,000 megawatts of electrical power has consequences that follow just as surely as those that can be expected in the wake of a careening car. I think these consequences belong in an impact report—not in the form of glib generalities about TV sets and electrical ovens but, rather, in specifics dealing with acreages for new factories and storage yards; the demands of these factories for raw materials; the tons of wastes that will be produced; the trucks needed to haul materials to the factories, finished products to the homes, and industrial waste and household garbage to the dumps; the highways on which the trucks will move; and all the other items that follow as surely as the seasons. To speak only of chipmunks and cottontails at the plant site and the alewives offshore is a travesty.

Throughout the report the "first straw" view prevailed. If a report is to enlighten its reader, it should be prepared with the opposite view, the "last straw" view. Take, for example, the 700 pounds of salt that are to be dumped each day into Lake Ontario. The lake holds some 400 cubic miles of water that already contain low concentrations of salt; consequently, the report argues, the planned addition of 700 pounds daily is trivial. Suppose, on the contrary, that the salt concentration in Lake Ontario was exceedingly high already. Would this supposition alter the argument concerning the dumping of salt in the lake? Not at all! If there are already millions of pounds of salt per cubic mile in the lake, then the addition of a mere 700 pounds per day is also trivial. I submit that if a report can reach the same conclusion from two totally different sets of data, it is either useless or misleading.

To be of use in arriving at rational decisions, an environmental impact study, even though it is prepared for a single power plant, cannot pretend that its subject exists in a vacuum. On the contrary, it must describe the entire nationwide community of power plants, of which its subject is but one. It is not enough to be told that the one plant will discharge 200,000 curies of radioactive gas yearly into the atmosphere. To evaluate the meaning of such an admission requires that we know how many other plants are doing the same and where these other plants are located. If present power policies are to continue, how many such plants are anticipated in the future? Nothing of value is gained if the impact report for the 2,000th nuclear power plant emphasizes that the expected emissions of salt, heat, and radioactive wastes will amount to only five ten-thousandths of what is already in the atmosphere and oceans.

The individual environmental impact study (though it may be of some local value) cannot possibly forestall disastrous environmental changes. Indeed, if one were asked to design a procedure that was guaranteed to produce disasters, the individual impact report would be an obvious suggestion. By being constrained to an analysis of individual stations, one by one, none of the study groups will notice when the heat, salt, radioactive wastes, and the cascading ramifications of energy production have merged throughout the length and breadth of the land. And for those who prepare impact studies as well as for those who merely flip through them, there will then be no place to hide.□

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

THE FRENCH CONCOCTION

International reputations will be decided by whether or not a giant ray gun in Bordeaux really cures cancer in rats and African sleeping sickness in mice.

BY DANIEL S. GREENBERG

THE CONSTRUCTION OF Antoine Priore's new laboratory in Bordeaux, France, is a few months behind schedule, which is understandable, since its centerpiece is an immensely complex and unique apparatus and Priore is the sole designer and supervisor of the project.

It will soon be completed, and then, after testing and calibration of the apparatus, several groups of animals in a holding room on the third floor will be injected with a usually lethal form of sleeping sickness. Some will be left in the room, almost certainly to die. Others will be taken to the ground floor of the laboratory, where they will be exposed to rays emanating from an instrument-packed, five-ton, bell-shaped dome suspended from the ceiling of a high chamber that resembles the science fiction set created by a runaway imagination and an ample budget.

Not long afterwards, when the animals' fates have been determined by a blue-ribbon panel of scientists, the men who run research in France will either be ridiculed as naïve dupes by their colleagues around the world or glowingly hailed for having had the courage to proceed with "L'Affaire Priore." The outcome might be no more than grist for a musical farce, with white-coated elders of science cast as a chorus of clowns, or it might open the way to a valuable avenue of medical therapy, leading toward far-off but exciting possibilities for treatment of a large array of human afflictions. The future may hold a Nobel Prize or a booby prize.

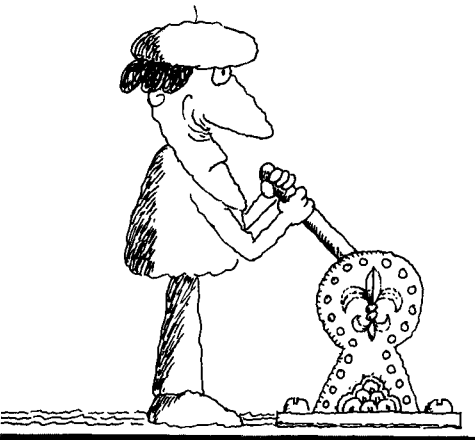
As things go in the normally well-disciplined and orderly processes of science, with its tradition of bits of knowledge accreting through the openly published efforts of degree-bearing investigators in properly certified institutions, the Priore goings-on are indeed a bizarre business. The French scientific community was riddled with accusations over "L'Affaire Priore." To those who say it smacks of charlatanism, antirationalism, and illicit political interference in the disposition of government research funds, Priore's proponents charge elitist blindness. It wouldn't be the first time that a man who demonstrably knows almost nothing about science has intuitively stumbled onto a revolutionary scientific development. Nonetheless, what has provided the matter with an air of sticky confusion is Priore's secretive manner. He has been extraordinarily cagey about the innards and output of his electrical contrivances, of which the new one is the fourth and largest he has built over the past 20 years. The professional capabilities of the scientific partisans pro and con Priore provide no clue to the truth, for on both sides can be found sensible people with international scientific reputations.

For example, there is Andre Lwoff, a microbiologist who shared the Nobel Prize for medicine or physiology in 1965 and who, after studying one of Priore's earlier machines at the request of the French government, vigorously recommended that government funds be provided and that the concept be pursued for its great scientific and medical potential. However, two physicists also studied it and dismissed it as a concoction of amateurish nonsense.

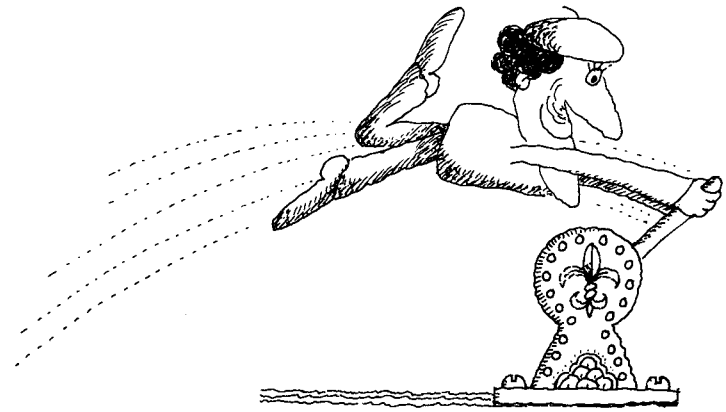
One key and unwavering backer of Priore is the highly influential Robert Courrier, secretary of the French Academy of Sciences, whose distinguished research in biology has brought him the rare honor of foreign membership in Britain's prestigious Royal Society. Still another investigator of the machine, director of one of the world's leading medical research centers, flatly dismisses it as a hoax and produces documentation to back his contention that several years ago healthy animals were covertly substituted for ailing ones to make it appear that the machine had "cured" them. The World Health Organization, however, with lines out to expert

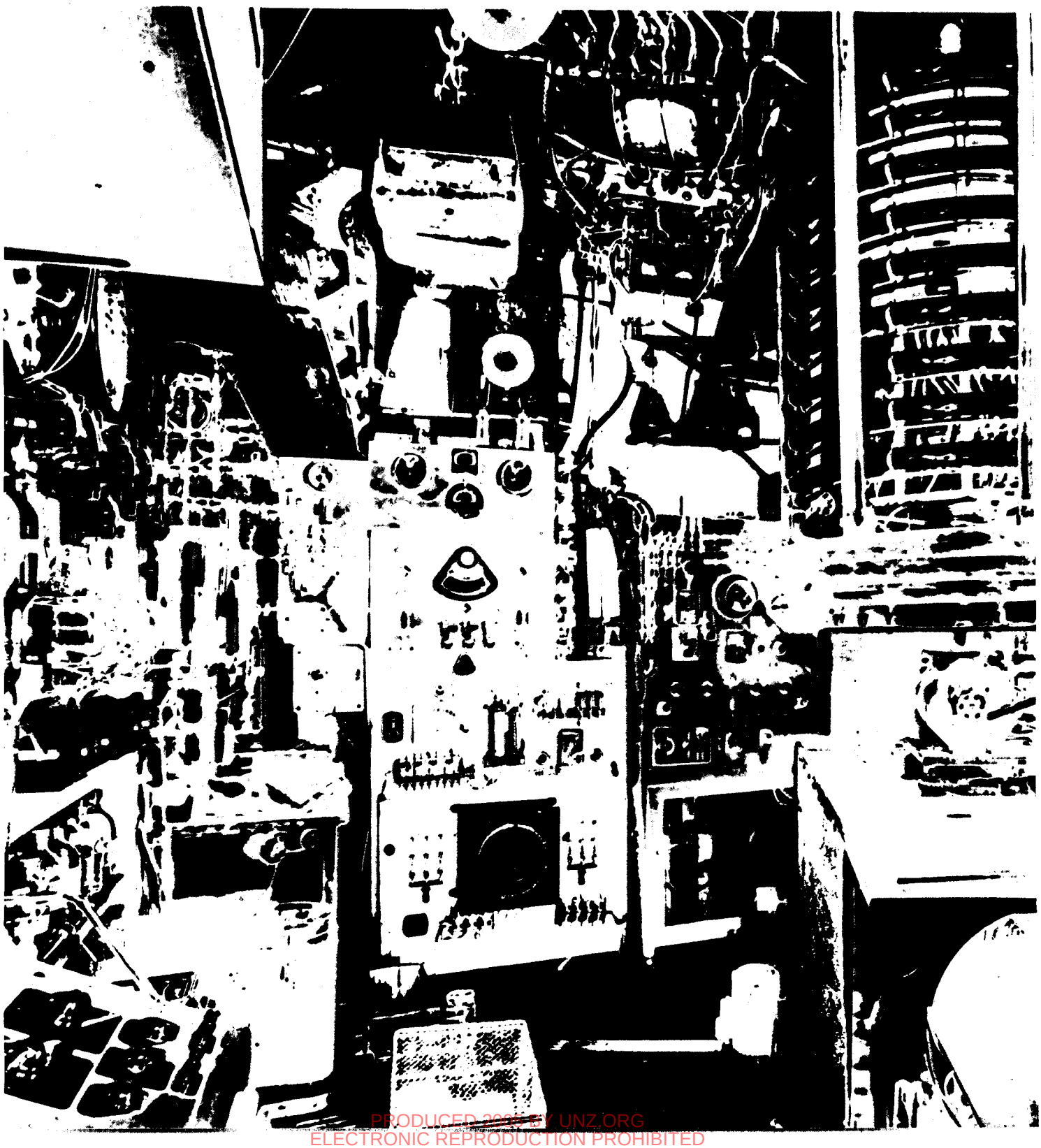
Daniel S. Greenberg is Washington editor of SR of The Sciences; *research assistance for this article was provided by Judith P. Miller, chief of the Pacifica Radio Washington bureau.*

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



PRODUCED 2009 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

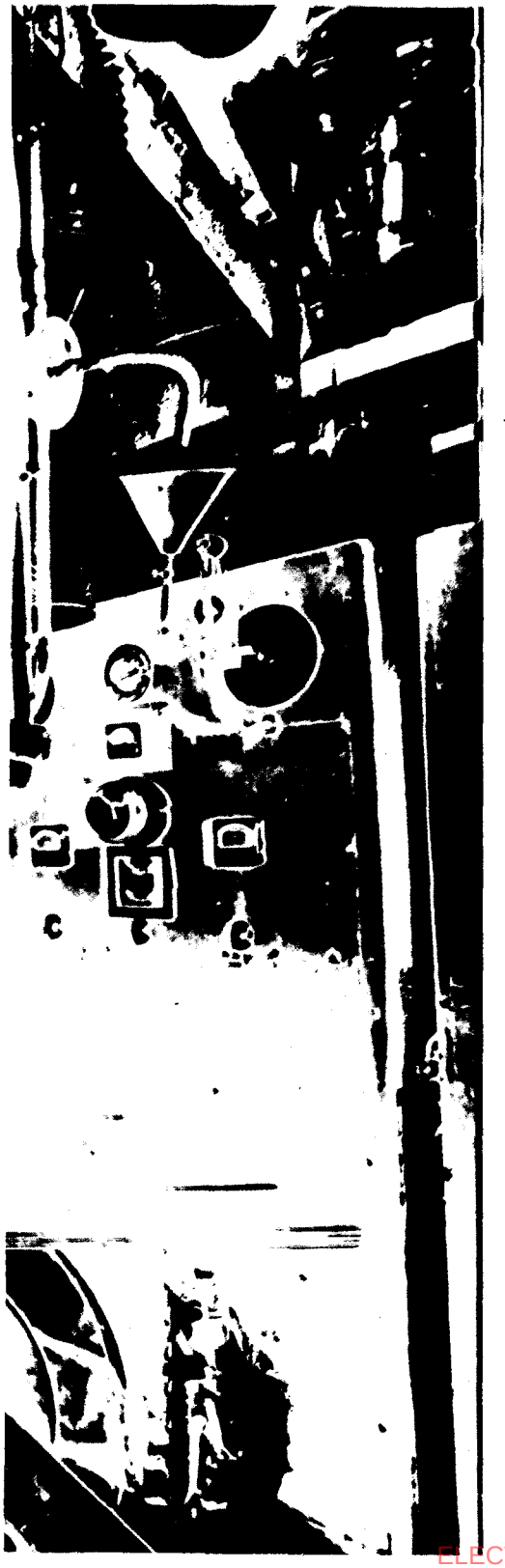




PRODUCED 2018 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

advice in virtually every medically related field of research, has been sufficiently impressed with Priore's work to provide him with a subsidy of $5,000 a year since 1969. And then, to confound the doubters, there are the medically astounding results of experiments that took place behind laboratory doors officially sealed and afterwards opened by the chief legal officer of Bordeaux, under the observation of a diverse and independent committee, to eliminate the chance of tampering.

L'Affaire, nearing a noisy climax after quietly seething through the



French scientific community for over a decade, takes its name from Antoine Priore, who by training and background is an improbable candidate for throwing any scientific community into turmoil. A former electrical engineer and radar officer in the navy of his native Italy and a decorated hero of the French underground, Priore settled in Bordeaux after the last World War, and, drawing on his radar experience, began to tinker with the use of electromagnetic radiation for killing the microorganisms that produce rot in fresh vegetables and fruit. It is a line of research that off and on has been pursued elsewhere by better-credentialed investigators than Priore, but all without results of commercial value. Except for whatever training he received in the navy, Priore, who is now 60, hasn't had any formal scientific education. He never went to a university, and he scorns university-style research, preferring instead the traditions of the backroom inventor.

By hoarding surplus bits and pieces of electrical apparatus from U.S. military stockpiles strewn around Europe after World War II, he eventually ended up with a 15-by-18-foot room so jammed with apparatus that it looked more like an electronics spare-parts storeroom than a functioning laboratory. But in the center of it all, hanging from the ceiling, was a nozzle-shaped device, and out of this nozzle, claimed Priore, came something of an electrical nature—never more precisely referred to than as "radiation in an electromagnetic field" that produced wondrously beneficial effects on experimental subjects situated on a table below. Was that really the case? Well, in those early days the only people paying attention to Priore's strange apparatus were true-believing friends and acquaintances who had no reason to doubt the ebullient, cigar-chomping loner when he proclaimed his machine a success. They not only trusted him; they heaped whatever meager funds they could on him, and when that was not possible, he secured loans.

Backroom innovation having long since been supplanted by invention-to-order in large, well-financed research establishments, Priore might well have matured in eccentric obscurity but for his access to the close-knit alumni of the French underground resistance movement, in which a fast-rising Bordeaux politician, Jacques Chaban-Delmas, had served years earlier as national coordinator for military planning. The two did not know each other during the war; but in 1947, after he was elected mayor of Bordeaux, Chaban-Delmas responded approvingly when he learned that a fellow hero of the Resistance was struggling alone to obtain recognition for a marvelous invention. Thereafter, Priore began to acquire, if not allies, at least sympathetic curiosity seekers in the established ranks of science and medicine, among them the chief veterinary officer of Bordeaux, through whom Priore's machine was brought to the attention of several members of the University of Bordeaux medical faculty.

Years went by as Priore, working alone and with little money, further developed his machine—while all the time keeping to himself the secret of what went into it and what, in his opinion, came out of it besides some vaguely defined form of electrical energy. But in 1960 several members of the Bordeaux medical faculty, intrigued by Priore's claims, obtained his cooperation for a series of experiments involving the treatment by his machine of cancerous implants in rats. The Bordeaux scientists were astonished to find that the cancerous growths were eliminated; but proceeding cautiously, and with time out for Priore to renovate his apparatus, they did not publish their results until 1966.

In the meantime, informal reports—mostly in the form of rumors—began to attract the attention of several powerful figures in French science, among them Academy Secretary Robert Courrier, who in 1964 rocked that august institution by reporting favorably on a series of experiments conducted by the Bordeaux investigators in collaboration with scientists from the Institute for Cancer Research, near Paris. Courrier reported that in controlled experiments with cancerous tissue grafted onto rats, the animals treated with Priore's machine survived, while the cancerous untreated control animals died.

Courrier instantly became a leading champion of Priore and at subsequent meetings of the academy reported favorably on various other experiments involving cancerous experimental animals. Courrier admitted that the results could be expected to evoke skepticism, especially since Priore adamantly refused to reveal the workings of the machine. But to investigate further whether something of therapeutic value was indeed coming out of Priore's mysterious apparatus, Courrier had helped arrange for a research assistant from the Institute of Cancer Research to take 18 cancerous rats to Bordeaux; there eight were to be treated under the machine—with only the assistant handling them—while the remainder were to go untreated.

Courrier's report to the academy was that the treated animals survived, while the others perished. Conceding that "science does not hold with apparatus which is shrouded in mystery," Courrier acknowledged the unorthodox nature of the research on

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

If you don't show your kids California, who will?

The giant redwoods.
See them on an American Airlines Fly/Drive Vacation.

Wouldn't it be a shame if your kids grew up without ever having seen the redwoods?

Or a sunset on the beach at Monterey?

Or Disneyland?

California has so many things for families to see and do.

And this summer, we're giving you a chance to see them.

We've put together what we think are, dollar for dollar, the best Fly/Drive Vacations any airline has ever offered.

They start at $178 and run to $238 for a week. And they all include an Avis or Hertz car with unlimited mileage. (You pay for gas.) Plus 6 nights' accommodations for up to a family of four at Sheraton Inns, Holiday Inns and Hyatt Houses. Air fare, of course, is extra (e.g. Dallas to Los Angeles is $150* for adults and we have special fares for children).

Our $187 vacation, for example, gives you an Avis car for a week and 6 nights' accommodations at many of the Holiday Inns around the State of California.

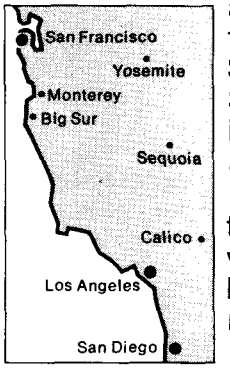
So you can do as you please, see whatever you please for as long as you please.

If you're in San Francisco, you might drive out to Yosemite for a picnic. And do a little hiking to work it off.

If you're in Los Angeles, you could head out to a movie studio and show the kids what the real world isn't like.

In San Diego, you might drive out to see a man ride a killer whale at Sea World. Or let the kids ride a burro at Calico, a restored mining town.

Why not talk to your Travel Agent. And ask him about our Fly/Drive Vacations, including auto-tape tours, to San Francisco, Los Angeles and San Diego. (If you like, you can fly into one city and fly home from another.)



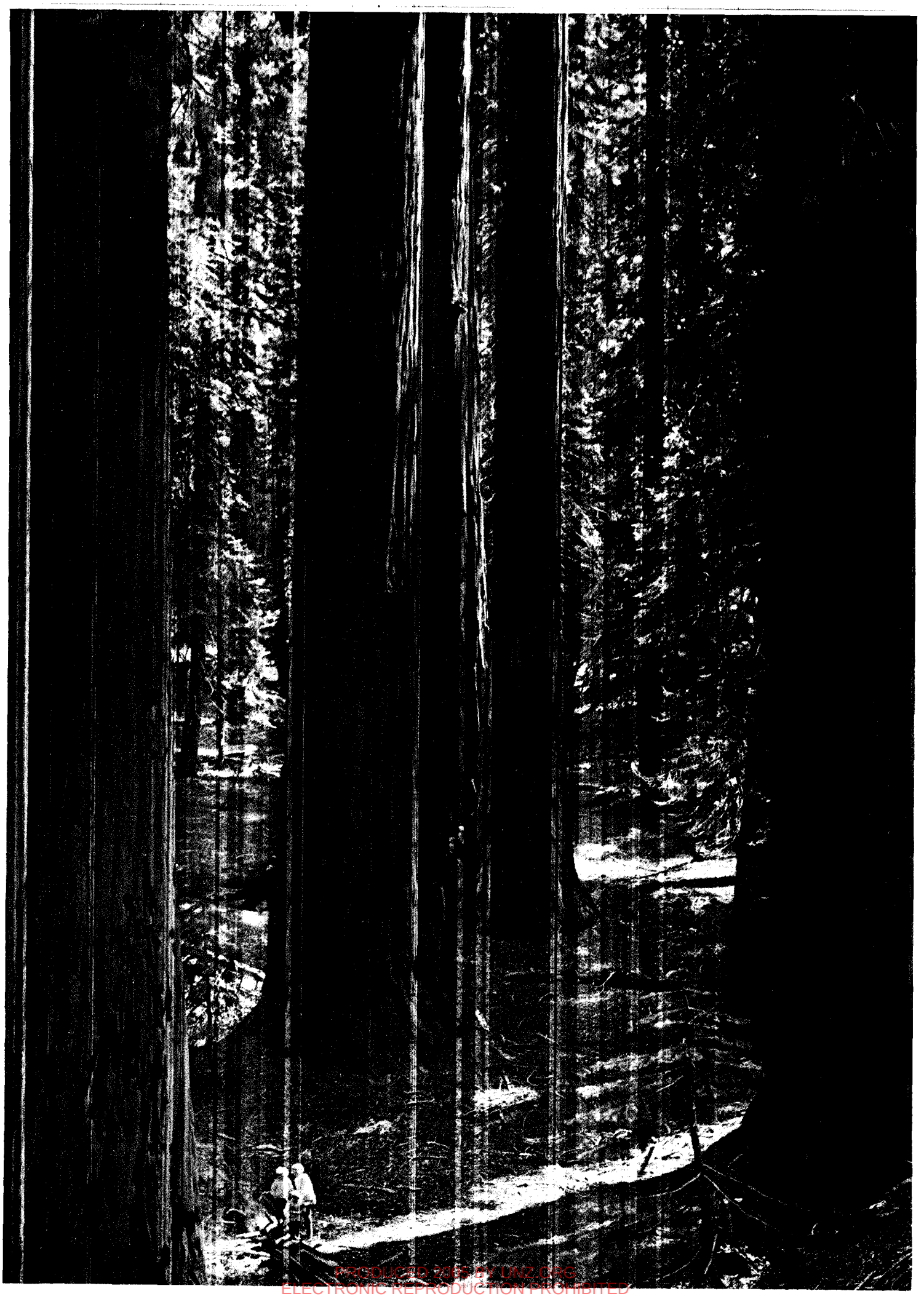
There's nothing we'd like better than to make this summer's family vacation one you'll always remember. And one your children will never forget.

American Airlines
To The Good Life.©

"The Good Life" © 1963, Paris Music Co., Inc. Used by permission.

*Prices quoted are special tour basing round trip coach airfares, subject to change without notice.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



PRODUCED 2015 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Photo of actual ranchland taken at Sangre de Cristo Ranches

Where the deer and the antelope play

Sangre de Cristo Ranches, Midway between Denver and Albuquerque. Where the Kit Carson Trail meets the Navajo Trail in beautiful Southern Colorado.

Big country. Wide open spaces. Majestic mountains surrounding green hillsides of the sleepy San Luis Valley. Rugged, yet serene. Crisp, clean air, scented with sagebrush and pine.

You can own land here. Leg-stretching, five-acre minimums. Land for ranches. For vacations. Retirement. For settling down and getting away from it all. For long term investment. To leave to your kids and for them to leave to theirs.

This is good land. Land you can see for yourself. Land you can stand on and dig into. It's a subdivision of the gigantic, 260 square mile Forbes Trinchera Ranch. Forbes Inc., publishers of Forbes Magazine and owners of Sangre de Cristo Ranches Inc. acquired the Trinchera Ranch some years ago. One of the oldest of the remaining big ranches in America, it ranks among the best known hunting preserves for deer, elk, game birds and other wildlife.

Located near the intersection of U.S. Route 160 and Colorado Highway 159 just outside Fort Garland, Colorado, Sangre de Cristo Ranches are spread over thousands of rolling acres which rise to the towering mountain peaks of the Trinchera and Mount Blanca.

Since Forbes Inc. began offering this section of its big ranch for homesites, thousands of people have come from all over the nation to see this magnificent land, to purchase their own Sangre de Cristo Ranch.

Important guarantees backed by Forbes Magazine's distinguished reputation have contributed much to the Sangre de Cristo success story. Every investor is double protected: he has twelve months after his first payment during which he can—and is urged—to visit his ranch. And if it doesn't fully meet expectations, he can have all payments promptly refunded. Or if he simply changes his mind within sixty days of making his first payment, his money will be returned promptly.

You can own part of this breathtaking land for just $50 monthly. With no interest or carrying charges, the total cost of these five-acre ranches is just $5,000. Other Sangre de Cristo ranch sites are available on comparable terms at prices ranging from $3,500 to $7,500. This offer presents a wonderful opportunity for long term investment in the great southwest.

For complete details on these ranches, without obligation, simply fill in and mail the coupon below to Sangre de Cristo Ranches, Box 2000, New York, N.Y. 10011.

Sangre de Cristo Ranches Inc.

DIVISION OF FORBES MAGAZINE
Box 2000, Old Chelsea Station, New York, N.Y. 10011

Without obligation, please send me FREE, more information on the Sangre de Cristo Ranches.

Name_____

Address_____

City_____ County_____

State_____ Zip_____

A statement and offering statement has been filed with the Department of State of the State of New York. The filing does not constitute approval of the sale or lease or offer for sale or lease by the Department of State or any officer thereof or that the Department of State has in any way passed upon the merits of such offering. A copy of the offering statement is available, upon request, from the subdivider.
NYA 72-833
A385 AD 6609 (b)

SANGRE DE CRISTO RANCHES INC., is a duly registered subdivision developer in and under the laws of the State of Colorado. This registration is not to be construed to imply state endorsement of the subdivision.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

which he had reported and expressed the hope that Priore would relent and permit suitable specialists to examine the machine. He had no sooner finished this statement when he was instantly assailed by a distinguished fellow academician for being at all associated with an enterprise that smacked of quackery. Science is conservative about its procedures and the certification of those who invoke its name. Why, it was demanded, was the secretary of the highest honorary scientific body in France lending his prestige to an apparatus "shrouded in mystery"?

The answer quite simply was that despite the departure from the normal ways of science and Priore's lack of credentials, Courrier was, if not persuaded, at least aroused and impressed by the reported results. His colleague, on the other hand, was repelled by so aberrant a deviation from science's established and time-honored methods of ferreting out nature's secrets and putting them to work in behalf of man.

More serious criticism was soon to come along, but in the tradition of science's reluctance to do its laundry in public, it received little circulation and had no effect on the gathering momentum of Priore's involvement with the established ranks of science. Though the full details have been screened behind science's penchant for respectability, it appears that in 1965, when Courrier was emerging as a champion of the machine, news of these strange happenings crossed the channel to one of Britain's major cancer research centers. Apparently drawn in by the endorsement of so esteemed a scientist as Courrier, researchers at that center sent Priore a group of mice in which malignant tumors had been implanted. Subsequently a group of healthy mice was returned; but when the English researchers examined the animals closely, they concluded that they were not the same ones as those that had been sent to Priore. The director of the English laboratory, possibly sensing the ridicule that might be directed at him and his institution if the episode became public, quietly terminated further association with Priore, though he did provide a French colleague with a detailed memorandum of the episode.

Meanwhile, the French government appointed a committee of scientists to get to the bottom of what, if anything, was involved in L'Affaire Priore. A member of that committee, director of a medical research center, reported that the exercise simply ended in frustration. "Anytime we wanted to copy parts of the machine to see which of its components were producing particular effects," he said, "Priore said we were not doing it right. When we sent technicians to measure what was coming out of the machine, it turned out that on those particular days the machine was not working properly. We suggested that Priore certify that the machine was working properly and that then we would carry out experiments under our supervision, but it was always impossible to get him to agree to what we considered to be essential conditions. And always there was Chaban-Delmas in the background to protect Priore."

It would not be the first time that a man who knows almost nothing about science has stumbled onto a revolutionary medical advancement.

The association of these two men—the influential politician and the self-styled scientist—may account for the fact that a financial institution had appeared on the scene to support Priore, namely, the agency responsible for coordinating Defense Ministry research. Chaban-Delmas's connection with this provident event is not readily traceable; but following service as mayor of Bordeaux, he served as minister of defense in 1957–58 and then for the next 11 years was president of the National Assembly, after which he was premier until last year. Of his politically important friend, Priore unhesitatingly states, "He helped me all the time."

In the mid-1960s, as controversy grew over the applicability of Priore's machine to the treatment of tumors, a new figure entered the picture, Professor R. Pautrizel, head of the Department of Immunology and Parasitology at the University of Bordeaux. An international authority on parasite-borne disease, Pautrizel became involved with Priore because his department, with some of the best animal-care facilities at the university, played host to the cancerous experimental animals that were being dispatched for treatment under the mysterious machine. It occurred to Pautrizel that the specific effect of the machine might be, not activity that inhibits tumors, but rather stimulation of the bodily defenses against any microbiological invasion.

Pautrizel's chief professional interest had for a long time been the blood parasite known as *Trypanosoma*, which induces what is commonly known as sleeping sickness—and, almost invariably, death. Carrying out a long series of experiments with Priore's machine, Pautrizel achieved incredible results. For example, in one experiment mice infected with trypanosomes were divided into two groups. All the untreated controls died within five days after inoculation, whereas survival was the outcome for 38 out of 46 that were treated under the machine. What's more, the survivors developed immunity to further infection. Pautrizel then tried the same experiment with rabbits and achieved equally impressive results. He and a collaborator also discovered that treatment with Priore's machine prevented the reproductive degeneration that normally afflicted rabbits suffering from chronic trypanosome infection.

In Paris, where the national administrators of science had long and uncomfortably wrestled with L'Affaire Priore, reports of Pautrizel's trypanosome experiments were warmly welcomed, for press reports of the Priore machine's effects on tumors in rats were giving rise to sensational rumors that a "miracle" cancer cure was imminent. Henceforth, it was quietly agreed, experimentation would be directed exclusively toward problems of arousing the body's natural immunity, with trypanosome infection being the specific disease under study.

Then in 1969 came one of the most bizarre episodes in this already richly bizarre affair. Despite Pautrizel's enthusiastically favorable reports, skeptics insisted that some sleight of hand must underlie the medically astonishing results. To counter this charge, Courrier, Pautrizel, and others in the Priore camp decided to perform a carefully controlled experiment under the supervision of a large and diverse committee whose honesty and scrutiny would be beyond reproach. The result was a committee whose membership included the prefect of the province, the executive secretary to the mayor of Bordeaux, an air force general, the chief of police of Bordeaux, several social security officials, the head of the city's electrical service, various members of the University of Bordeaux faculty, including the dean of the law school, and the chief law officer of the city, who was responsible for sealing and opening the door to the laboratory where the test animals and the controls were kept. The result, duly signed and attested to by the above-denoted gentlemen, was that of 30 mice infected with trypanosomes and treated under Priore's machine, 29 lived; of 30 infected and not treated, 26 were dead within five days; 30 that

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

were uninfected and untreated carried on normally.

With these results in hand, pressure mounted for the government to give Priore funds to construct a super-powerful machine, one that he claimed could deliver effective treatment in minutes instead of the hours required with his patched-together, homemade models. To examine this possibility, a new committee was appointed, representing all opinions in the long and hotly contended affair. Most of the doubters, however, had swung around to the view that the simplest course would be to give Priore what he wanted—but only on the condition that outside teams could have access to the new machine, both to examine whatever it was that came out of it and to perform experiments without interference. For this purpose, one group insisted that the machine be constructed at a university. But Priore simply refused to go along with that and said he would cooperate only if the new machine were constructed in a new wing on the building that housed its predecessors. According to participants, always looming in the background was the influential Chaban-Delmas, who at that point held the office of premier. The burden of providing the financial support was assigned to France's principal agency for nonmilitary research, the Délégation Général à la Recherche Scientifique et Technique (DGRST), whose director, Pierre Aigrain, an American-trained physicist, eventually agreed to provide the equivalent of $700,000 for the venture. Aigrain, who discusses the affair with a mixture of humor and annoyance, explained that before proceeding he insisted that Priore enter into a firm contract that specifies that government-approved research teams be guaranteed access to the machine, that the construction, though following Priore's design and under his supervision, be carried out by a contracting firm, and, finally, that the machine would not be used to treat humans. Why that last clause? "To play up the cancer angle," Aigrain said sharply, "is a form of murder. It raises false hopes and diverts people from treatment that, though imperfect, offers some chance of improvement."

Aigrain added that he is "convinced of the good faith of Priore and his associates, but I'll be personally astonished if something comes out of this." Why, then, was he providing support? "Our biologists disagree on whether the machine produces effects of an unexpected nature. There might be some very simple explanation for the trypanosome and tumor results. For example, we don't know whether the machine is producing X rays. At least by supporting him to build a machine that we can examine and use, we'll be returning to the normal practices of science. I wouldn't put $1 million into it, but for $700,000 we'll find out one way or another."

Hanging from the ceiling in the center of his laboratory was a huge device that emitted strange "curing" rays from its nozzle.

"Besides," Aigrain said, "we'll be able to salvage all but about $200,000 of the equipment if it doesn't work out."

Had Aigrain responded to political pressure? "There were some pressures," he acknowledged, "but they didn't determine the matter. If Priore hadn't had the strong scientific support that he had, it would have been impossible to make a case for backing him."

But didn't that support strongly suggest that the machine performs as Priore claims it does? Aigrain smiled. "Some of our scientists are like some of yours. They're willing to back anything, so long as money is spent on research. They're like the man who accepts the bet of 5 cents to a million dollars that he can jump across the Atlantic and, when he fails, says he knew he couldn't do it, but the odds were so favorable."

As for Priore, I located him in a small café almost directly across the heavily traveled road near which his new laboratory is being constructed. A short, squat man of cheerful disposition, dressed in a tweed suit with vest, white shirt, and tie and wearing on his lapel a ribbon of the French Resistance, he was surrounded by hangers-on, who seemed to regard him as something of a neighborhood character and hero.

"They said the machine would cost $700,000?" he asked with surprise. "No," he insisted, "the correct figure is $3 million, all in government money. Why, I just came back from the United States, where I bought $300,000 worth of electronic equipment." He dispatched a young man to the lab across the street. The youth returned quickly, carrying an airplane ticket. "Look at this," Priore said. "I went on February 20 to buy the equipment. Deliveries take too long here from the European companies. So I went to the States and got what I wanted immediately." He says he hopes that the new machine will persuade the skeptics: "It will be powerful, it can work in minutes, and then they will see for themselves."

To what extent had Chaban-Delmas helped him through his years of trials? "Oh," replied Priore, "right from the beginning, like a good friend. He got me all sorts of materiel; he had connections with the army, and they loaned me large trucks and radar equipment. He arranged for me to get animals, all sorts of things. But don't get the idea that I'm interested in politics. Left, right—it's all the same to me."

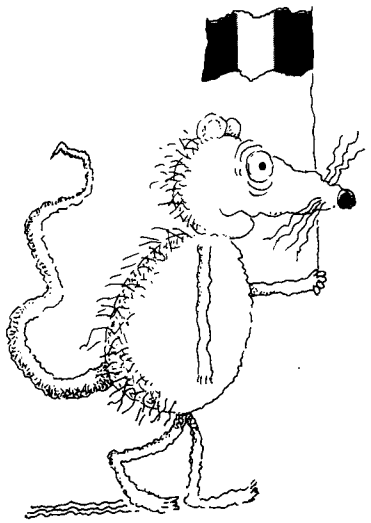
Priore waved aside the question of how his machine works. "Like radar," he said. "High-frequency waves, electromagnetism. That's the way it works." And then he led a tour of the new laboratory, the complexity and abundance of whose apparatus suggests either an ingenious orchestrator of the most modern electronic gear or a mad tinkerer slapping together consoles, "black boxes," and control boards randomly selected from an electronics catalog. "Look at it," Priore proclaimed with the pride of the loner who has whipped the establishment.

"The best equipment, the best."

Perhaps the most insightful judgment of all concerning the strange L'Affaire Priore came from Jean-Pierre Bader, now chief of gastroenterology at a major suburban Paris hospital, who from 1965 to 1970 was scientific director for medical research of the principal French government agency for biomedical science. "The case is a mystical problem, not a very scientific one," Bader said. "Priore is the contrary of a scientific man. It's not possible to discuss science with him. He says he built the machine from 'feeling.' Some of the research results are impressive, but it is difficult to say anything with assurance.

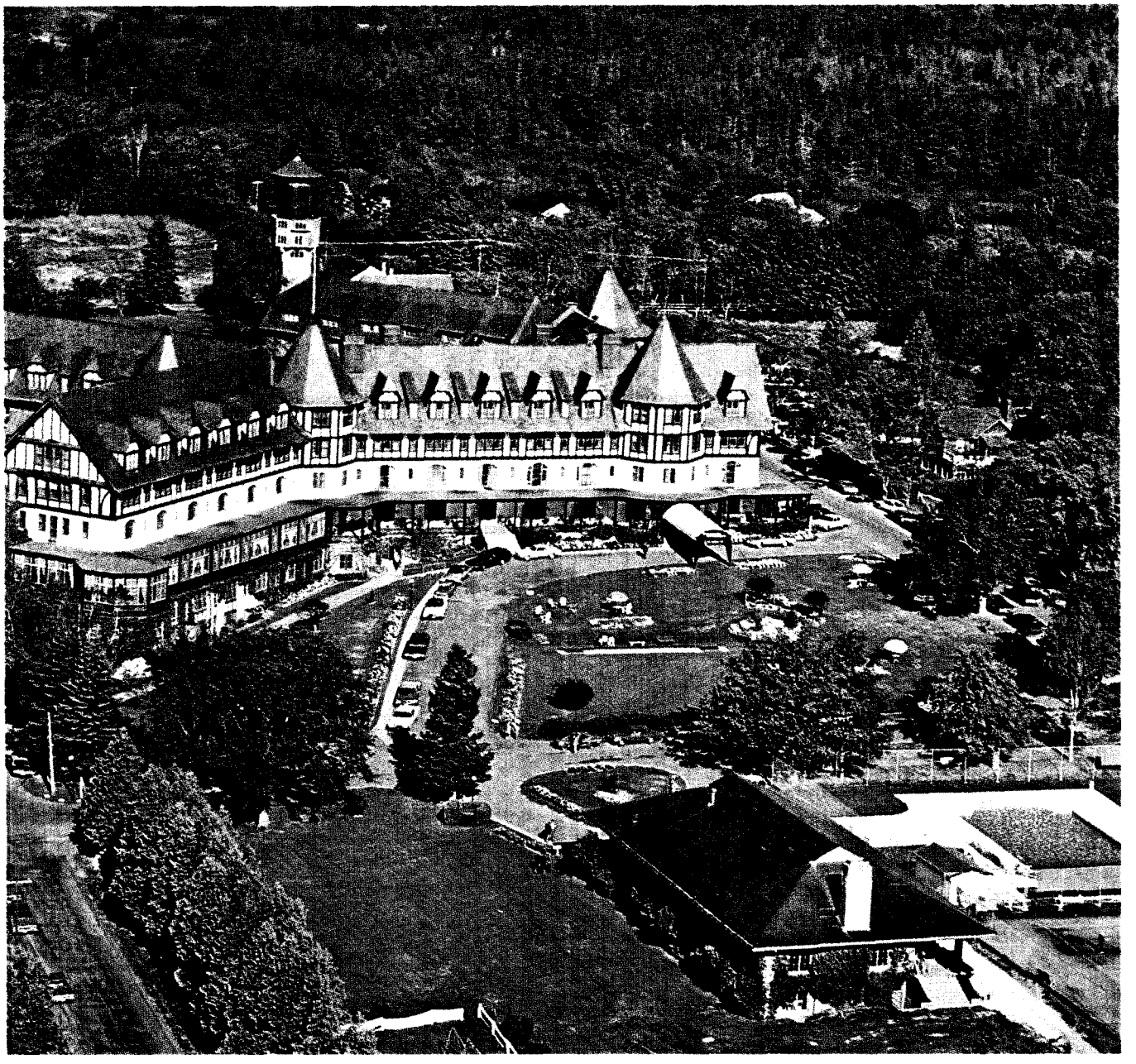
"It's possible that we'll look ridiculous in the scientific world if it turns out that we've supported a charlatan; but on the basis of what we know so far, it's not possible to neglect this inquiry.

"What do I think of Priore?" Bader said. "Oh, a mixture of genius and madman. It's all become a matter of strong feelings, but I'm trying to stay cool. We'll have an answer in a few months."□



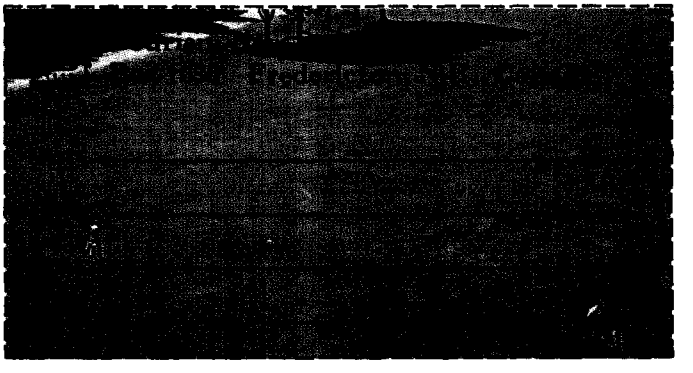
***SR of The Sciences* will keep watch on L'Affaire Priore and will report any new developments.**

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



New Brunswick is...

...a summer (and autumn) playground, laced with freshwater lakes and deep running rivers and bordered by 600 miles of seashore. The ambience inspires golf, tennis, swimming, boating, fishing, antique and handcraft collecting, sunbathing and healthy appetites. The air, scented by sea and forest, positively encourages deep breathing, invites naps and restful slumber. Up top we show the 200-room Algonquin Hotel in the resort town of St. Andrews-by-the-sea. One of many hotels and motels, large and small, in the area. Algonquin daily rates range from $22 to $31 double, per person, Modified American Plan. St. Andrews has a championship golf course (green fees are $6 per day), even an ice skating rink and hockey school. Family vacations a specialty. The atmosphere is informal, the pace relaxed and the people warm and friendly. Come and discover it yourself.



Canada's Picture Province

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The ambience is that of the interior of a lung. Arterial red walls impinge upon the unguarded retina with a peculiar vibratory quality, heaving suddenly through a series of strangely graceful convulsions into a voluptuously distorted parallelepiped. My attention is focused on a tapestry. The dizzying hieroglyphics of its concentric weave throw me off balance, and abruptly I am hurtling through inner space. ■ Outrageous images spin out of the darkness, each leering for some tiny fraction of a second before fading, mockingly, into a matrix of incomprehensible density. I forget most of them as soon as they flash by, though some linger, enticing me to wonder. A triumphant, black-maned hoyden straddles the visible landscape with raised fists. From her giant mouth dangle two bare, spindly legs (my own), anchored into ridiculously huge, high-back ski boots. A neon sign flashes. A Cadillac with female breasts for headlights pulls up. A black man, a baby, and a fat woman wearing a helmet with horns are riding on the hood. A piece of chocolate cake materializes, and I can smell its aroma. A hamburger with an eye in it spins toward me. I bite into it, carefully avoiding the eye. It tastes of brass; I spit it out. Napoleon appears, screaming and clutching his phallus. Richard Nixon rides by on a tricycle, bumpily careering across a field of women's shoes. ■ A woman I have seen before, somewhere, stands in an eerily lighted field of bright, white-yellow grain that undulates gently in the breeze. She stands frozen in place, one hand reaching out, the other dangling a small, blue cape. Her smile is wide but arctic, like the slate-blue sky behind her. This image fills me with an instant, overwhelming yearning for something I cannot adequately define, for some kind of unity, a final resolution. I reach out and touch the cape. The fabric is like liquid. Drops of water fall from my fingertips. The smile on the woman's face fades. A feeling of doubt, failure, banality, sweeps over me. ■ And having stopped to doubt, I emerge to find myself sitting on a mattress in the lotus position in a small room with red walls. Before me, on the dusty floor, is a small box about eight inches long. It emits a few tentative, high-frequency squeaks as my eyes focus on it, the *deus ex machina* of my brief, bizarre apotheosis—an alpha-theta feedback trainer.

BY DAVID RØRVIK

The Theta Experience

ELECTRONIC INSIGHTS

MENTAL VOYAGES like the "theta experience" described above are of special interest to psychologist Elmer Green, head of the Psychophysiology Laboratory at the Menninger Foundation in Topeka, Kansas. Green directs a project that is using the technique of biofeedback training to map those mental states associated with theta waves (brain waves characterized by a frequency of roughly seven cycles per second).

David Rørvik is a freelance science writer and novelist who lives on Flathead Lake in Montana.

Funded by the National Institute of Mental Health and various private foundations, Green and his colleagues are trying to find out whether an individual, by voluntarily increasing his output of theta waves, can enhance his ability to think and act creatively.

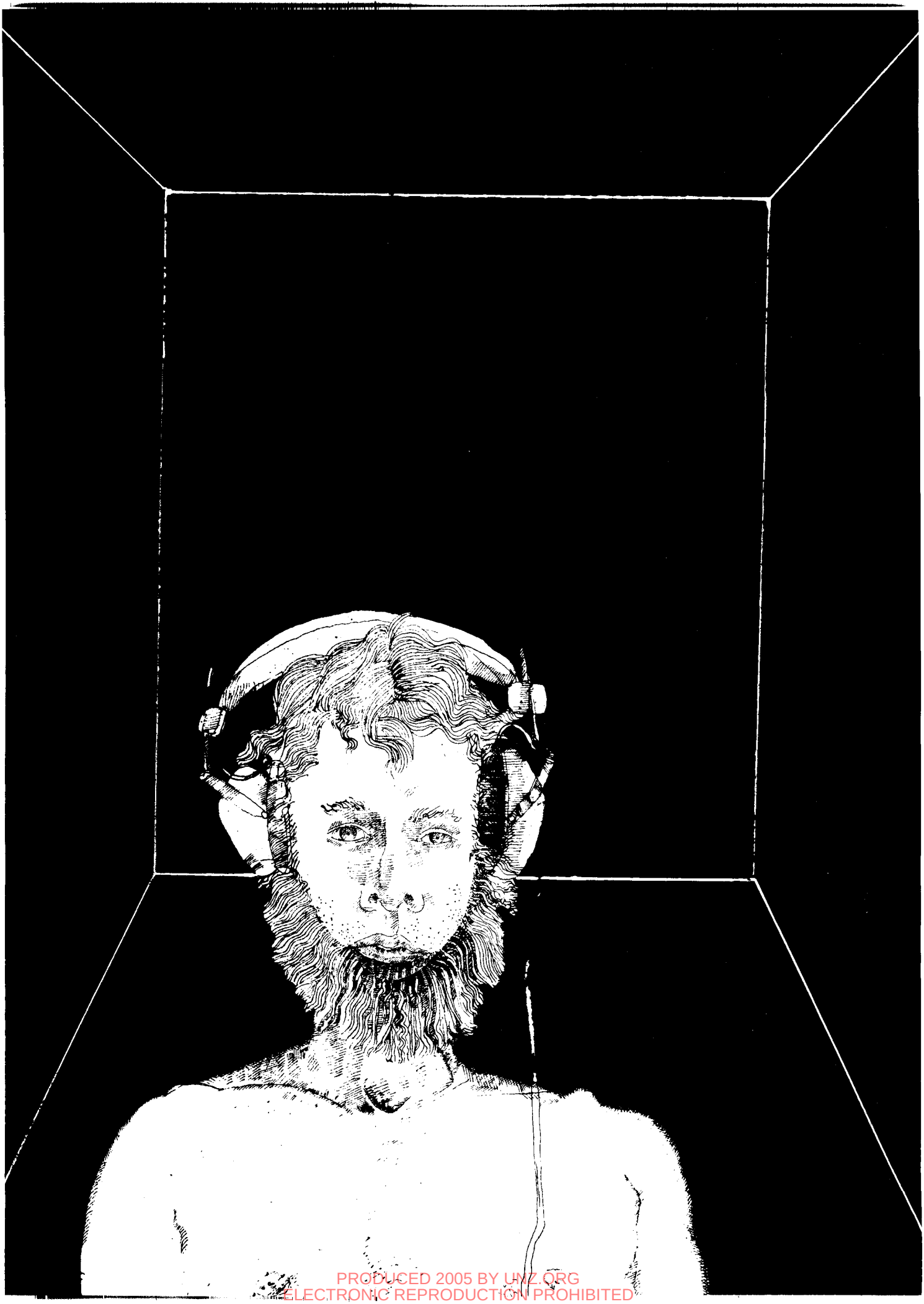
Their study is part of a wave of exploration that began back in the 1960s, when hundreds of thousands of people began to use hallucinogenic, "mind-expanding" drugs. Many—perhaps most—tripped for fun or escape. Some, however, used drugs in a serious exploration of consciousness and as an experimental means of charting those inner entities that traditional behavioral scientists had declared unknowable.

The drug culture, with all its dangers, did focus attention on variations in states of mind. Researchers, however, soon began to wonder whether there might not be tools more reliable and safer than drugs for altering consciousness. Why, they asked, are so few Zen and Yoga adepts abandoning meditation for LSD?

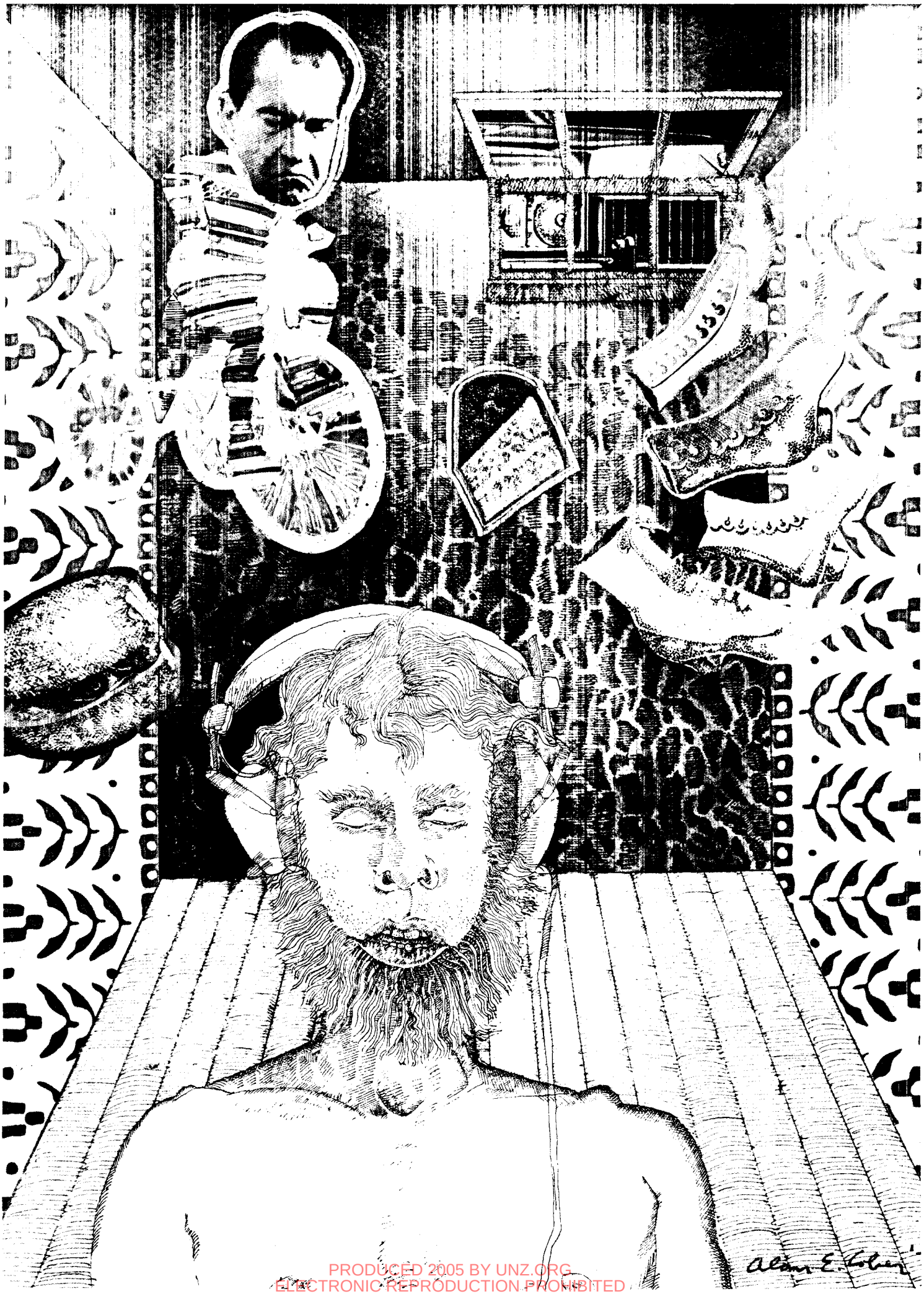
When the Zen and Yoga meditators finally were given their day in court, the verdict was, to the uninitiated at least, astonishing. Wired to EEG

Illustrations by Alan Cober

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

machines and other monitoring devices, they demonstrated that they could voluntarily produce trance states, alter body temperature (in some cases even by a specified number of degrees), raise and lower blood pressure, slow heart rates, control pain and blood flow. In general, they proved able to tap into physiological functions usually thought to be beyond the reach of conscious control. Now the question was, Can these skills be acquired without spending a lifetime on a mountain top? According to biofeedback researchers, the answer is yes.

Feedback has been defined by mathematician Norbert Weiner as "a method of controlling a system by reinserting into it the results of its past performance." *Bio*feedback involves the feedback, or "reinsertion," of information about *bodily* functions. It provides us with an inner eye and ear attuned to processes that are normally inaccessible to the conscious mind.

The brain produces electrical activity that can be portrayed, with the aid of an EEG machine, as a series of constantly changing wave patterns. Electric signals from the brain are picked up by electrodes attached to the scalp with special conductive glue. These signals are then translated onto graph paper as brain waves of varying frequencies (cycles per second) and amplitudes. By means of this technique, four primary brain-wave categories have been identified—*delta, theta, alpha,* and *beta*—all of which are contained within a total energy spectrum of about 0 to 40 cycles per second. Beta is the fastest of the waves and is associated with normal, speaking, moving-about activity, in which attention is primarily focused outward. Alpha and theta are respectively slower-paced waves and seem to be associated with inward focus, problem solving, creativity, sorting and filing of incoming data, and retrieval of information already deposited in the brain's memory bank. Alpha can be produced while the mind is awake but "stilled," while theta is normally produced only in the early phases of sleep. Delta, the slowest wave, is associated with deep sleep.

Subjects are *not* trained to control their brain waves, Dr. Green says. "There is training only in the elicitation of certain subjective states that are accompanied by oscillating voltages in the cerebral cortex.... Brain waves, as such, are not known to have any sensory representation whatsoever by means of which they can be detected. What *are* detected and manipulated in some unknown way are focus of attention, thought processes, and subjective feelings....

"The voluntary-controls program in our laboratory is one of thought, emotion, and attention control. It is desirable to remain aware of the primacy of the psychological state in discussing this type of research, even though it is convenient to use the shorthand of terms such as alpha training, temperature training, etc. The unique value of feedback instrumentation is that it gives the subject an immediate indication of his progress. Through external feedback the subject can filter out from the welter of existential cues those particular ones that he must learn to manipulate."

The possibility of focusing conscious awareness on a specific internal state of mind, associated with one of the brain-wave categories, was first suggested in 1958 by Dr. Joseph Kamiya. He was then at the University of Chicago and is now a research specialist at Langley Porter Neuropsychiatric Institute in San Francisco. Dr. Kamiya monitored the brain waves from a subject who had been told to close his eyes and guess whether he was in "state A" (alpha waves predominant) or "state B" (non-alpha) whenever a bell rang. He was told after each guess whether he was right or wrong. Given this feedback on his performance, the subject quickly learned to distinguish between the two states. His guesses were only 50 per cent accurate on the first day (no better than chance), but by the fourth day of feedback training they were 100 per cent accurate. Others were tested with similar results, and soon it was demonstrated that the subjects could switch either state on or off at will.

IMAGERY SEEMS TO BLOOM, FULLY FORMED, OUT OF THE FERTILE BUT USUALLY INACCESSIBLE SOIL OF THE SUBCONSCIOUS.

Once Dr. Kamiya and others had demonstrated alpha control, dozens of researchers began exploring the possibilities of using it to treat physical and mental ills. If we can successfully feed back information on brain waves, they asked, why not do the same with heart rate, blood pressure, muscle tension, gastric acidity, and so on? Why not use biofeedback to correct bodily malfunctions voluntarily without resorting to drugs or other medical intervention? Inherent in these suggestions was the unprecedented idea that the individual could take responsibility for his own physical and mental health.

Indeed, biofeedback has been successfully applied to a succession of ills (see box, page 50). Though the work is still experimental, the results have been extremely promising.

But many researchers believe that biofeedback will have its greatest impact in the experiential domain, illuminating many of the processes of the mind, while providing access to the unconscious and possibly even to previously unimagined experiences. Conceived as a tool to map the dimensions of inner man, biofeedback may expand those dimensions in the process.

Green's theta project at Menninger falls squarely in this experiential domain. In a small, darkened chamber, silent except for the music of the mind playing through a portable EEG machine, subjects often see things that normally go unnoticed by the conscious mind: imagery that seems to bloom, fully formed, out of the fertile but usually inaccessible soil of the subconscious; imagery so extraordinarily vivid that it is often indistinguishable from reality; "experiential hallucinations" that are living, breathing experiences complete with sights, sounds, feelings, and even smells and tastes.

Green, a physicist-turned-psychologist, his wife Alyce, a psychologist, and E. Dale Walters, also a psychologist, began actively investigating theta states when some of their early brain-wave subjects reported slipping occasionally into a reverie populated with dreamlike images that seemed to spring up spontaneously out of the subconscious mind. The EEG records showed that these unusual experiences were consistently associated with theta activity.

Coincidentally, at about this same time Alyce Green was doing graduate work on the concept of creativity at the University of Chicago. She had observed that many of the world's most creative thinkers seemed to rely upon reverie-like states of mind for their greatest ideas. They used such phrases as "the fringe of consciousness," the "off-consciousness," and the "transliminal mind" to describe the sources of their ideas.

Louisa May Alcott told of sending messages to her subconscious and, while in such states, requesting assistance in her writing. Frequently, days or weeks after "posting" her requests, she would get a "letter" back

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Applied Biofeedback

Scientists are currently experimenting with biofeedback training in these areas:

ANXIETY CONTROL. Alpha training and the amplified sounds of breathing have been used to teach subjects to relax and breathe easier. Dr. Thomas Budzynski and his associate, Johann Stoyva, at the University of Colorado use an electromyograph (EMG) machine to feed back information on muscle tension in the frontalis (forehead) muscle. The EMG machine feeds back an audio tone that rises when the muscle contracts and falls when it relaxes. As the frontalis relaxes, the scalp, neck, and upper body relax as well. In all of these examples, once the technique has been learned, feedback instrumentation can be dispensed with.

CONTROL OF MIGRAINE AND TENSION HEADACHES. Common tension headaches also have yielded to Dr. Budzynski's muscle feedback technique, while migraine headaches, of different origin, have been overcome in many cases with a blood-flow-control procedure developed at the Menninger Foundation. By learning to increase the temperature of the hands (using sensors attached to the fingers and a temperature feedback meter), migraine sufferers increase the flow of blood into their hands and, in this way, reduce blood pressure in other parts of the body, specifically in the vessels of the scalp where the migraine pain originates.

HEART AND BLOOD-PRESSURE CONTROL is being investigated by researchers all across the country. Typical of these efforts is one headed by Dr. Bernard T. Engel at the Baltimore City Hospital. He and his colleagues teach patients to control dangerous irregularities by feeding back heart-rate information on a "traffic signal" light panel. A cardiotachometer translates heartbeats into red, yellow, or green lights. When the red light is on, the patient knows his heart is beating too fast; when the green light is on, it is beating too slowly. Soon the subject learns to keep the heart beating in the safe area signaled by the intermediate yellow light. Researchers, at the Harvard Medical School, the University of Tennessee, and elsewhere, similarly have taught subjects to lower their blood pressures voluntarily, an achievement with far-reaching significance for treating hypertension.

MUSCLE CONTROL is being taught, using EMG feedback, to overcome muscular tics and spasms, anxiety, fatigue, and even serious muscle damage. Dr. Harold Booker and his colleagues at the University of Wisconsin taught a woman to regain the use of her facial muscles after her face had been immobilized by muscle damage resulting from a car accident. She learned, with biofeedback, to control them all over again, one at a time.

Dr. John V. Basmajian of Emory University, using an audio feedback system that amplifies the electrical energy in muscles, has even trained several subjects to "fire" *individual* muscle cells at will. Some have become so expert at this that they can fire off cells in rhythmic sequences resembling drum rolls. Such precision may ultimately prove beneficial in controlling sophisticated prosthetic devices (such as artificial hands) without the encumbering mechanisms required today.

Biofeedback researchers say we have only scratched the surface of potential medical applications. Ulcers, they believe, are susceptible to biofeedback therapy, and small "radio pills" that can be swallowed to feed back information on stomach acidity are already being developed. Epilepsy has shown signs of responding to biofeedback, and researchers are now looking at other serious brain disorders to determine whether they, too, might yield to feedback treatment. Eventually biofeedback may enable women to control ovulation, providing the ultimate in birth control.

As for mental health, some biofeedback pioneers, such as Dr. Barbara Brown, chief of experiential psychology at the Veterans Administration Hospital in Sepulveda, California, envision the day when brain-wave analysis can be used to reveal incipient mental disorders. Once the diagnosis is made, Dr. Brown explains, an individualized program for biofeedback treatment can be supplied. "The potential patient can then visit his neighborhood computer self-treatment center, where he inserts the taped treatment program into the computerized feedback system and continues treatment until all signs of the potentially abnormal condition have disappeared."

with the inspirations or solutions she had sought. Robert Louis Stevenson came up with complete, publishable plots by commanding "the brownies" of his mind to spin yarns while he was in a trancelike state. The German chemist Kekule's famous theory of molecular construction supposedly came to him in a series of deep reveries in which atoms "gamboled" before his eyes, forming into closed chains or rings, which he envisioned, at one point, as snakes biting their own tails.

The Greens report, "There are literally hundreds of other anecdotes that show beyond doubt that in some way not yet well understood, reverie, hypnagogic imagery and its partner hypnopompic imagery, and creativity are associated." The hypnagogic state occurs in the transition from consciousness to unconsciousness; the hypnopompic state develops in the shift from sleep to wakefulness. Reverie encompasses both types of imagery and is defined by the Greens as "inward-turned abstract attention or internal scanning." This imagery (behind closed eyelids) is usually independent of conscious control and, typically, is more vivid and original than images seen in normal dreaming.

Pilot experiments followed in which it was demonstrated that meditators and others adept at internal scanning were, as suspected, in the theta or alpha-theta border region during production of hypnagogic imagery. And it was further demonstrated that, by using audio feedback tones to alert the individual to the production of theta in his brain, far more of this imagery could be called up into the conscious domain, so that the subject becomes aware of it.

Encouraged, the Menninger team, now nine members strong, launched a full-scale study, using for its initial subjects ten male students from nearby Washburn College. (Female subjects will be used in a later study.) The students were given a battery of psychological tests and were selected on the basis of their ability to verbalize internal feelings and to produce at least 25 per cent alpha in their EEG patterns. (Individuals who produce less than this, for reasons unknown, seem unable to alter significantly their brain wave patterns.) No effort was made to select creative or intellectually superior students; in fact, those applicants who were "too sophisticated" in biofeedback and various psychological theories were eliminated. Once selected, the students were told only that they were taking part in a training program in the self-regulation of the nervous system."

The students were instructed to make the alpha and theta tones sound

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

as frequently as possible. During their ten weeks in the project each of them spent roughly an hour a day in feedback training in a room set aside for this purpose at the college. Periodically they returned to Menninger for feedback sessions in the laboratory there. This enabled the researchers to note each student's progress and to question him about his experiences. Additionally, each student kept a daily log detailing thoughts, feelings, and images related to the feedback experiences.

During the latter part of the study an intercom system was set up between the control room and the feedback room so that the researchers, constantly monitoring the brain waves of their subjects, could interrupt whenever they saw theta bursts and ask what was happening at that moment. This helped the students who had difficulty remembering the imagery for any length of time describe their visualizations on the spot—before they could dissolve like dreams.

The researchers were not concerned in this preliminary phase of the study with creativity per se. At first they simply wanted to demonstrate, if possible, that naïve subjects could be made aware of normally unconscious imagery of the sort that seems to be linked to creative thought processes. It is evident now that they succeeded in this; only one of the ten students failed to increase significantly his awareness of hypnagogic imagery.

STUDENTS NOTED SIMILARITIES BETWEEN THE THETA AND LSD STATES AND FOUND THEMSELVES MOVING AWAY FROM DRUGS.

Some of the results of the study, while unlooked for, were nonetheless welcomed. When the experience is over, the student is likely to emerge into the "real" world feeling euphoric, energized, able to focus attention and to study for long periods of time without fatigue or distraction. Problems of long standing may suddenly resolve themselves; papers that must be written sometimes flow from the pen or typewriter with unaccustomed ease. Memory is often sharpened. Several of the students in the project reported experiencing "heightened sensitivity" in their relationships with other people; others referred to an awakened "sense of responsibility" in their personal and social interactions. Some, particularly those who had had extensive drug experiences, said the brainwave sessions left them feeling "high" for hours.

Two students in the project who had been heavy drug users reported that their outlook on chemical "trips" was altered by their biofeedback experiences. Both students were highly successful in producing large quantities of alpha and theta, and both noted similarities between theta and LSD states. Now they report they are moving away from drugs.

In several cases the theta experience seemed to extend into the psychic domain of extrasensory and precognitive perception. In the pilot experiments there were three instances of apparent psychic perception, each arising spontaneously. These experiences have only begun to be assessed, and, as Dr. Green notes, far more subjects will have to be trained and observed before it can be stated that there is a genuine psychic component in the theta experience. But consider this anecdotal evidence:

Tal Vivian, a 22-year-old psychology student, had some of the most vivid theta experiences of the group. During one feedback session he "saw" himself in debate before the research committee he was scheduled to visit the next day for the purpose of defending one of his research projects. The imagery, voices, and words spoken during this experience were so persuasive that it seemed as if the drama unfolding in the mind's eye were really happening. As it turned out, the experience was a useful and detailed rehearsal for the actual confrontation.

He often found himself guessing who would be on the phone whenever it rang. He was consistently correct—even when the callers were individuals he hadn't heard from for long periods of time. On another occasion, this time while in a reverie, he saw a letter arrive at his apartment with word that he had been accepted for graduate school; he saw his roommate informing him of his acceptance as he (Tal) arrived at the door. When he went home that afternoon, there at the door, just as he had foreseen, was his roommate, who promptly gave him the good news.

More disturbingly, Tal claims he "saw" the shooting of George Wallace a few days before it actually occurred. The premonition came to him one evening just before he went to sleep, when he was in that peculiar state of mind between consciousness and unconsciousness that he had come to recognize as theta. An intense, sincere student who is reluctant to talk about these occurrences, Tal seems highly unlikely to be embroidering on the truth of his experiences.

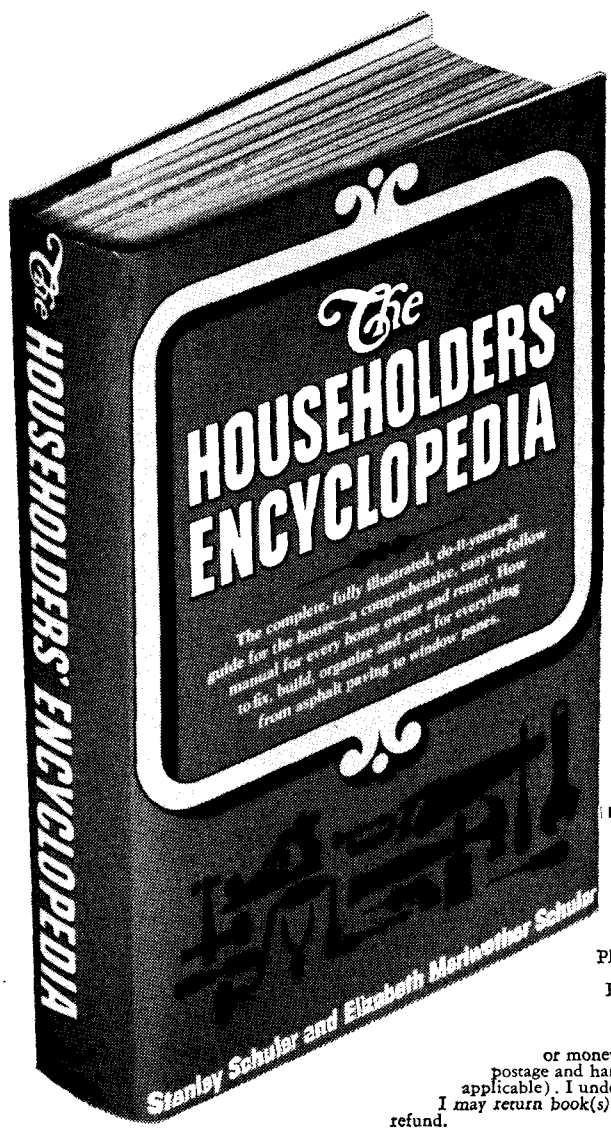
An additional ten students now have been trained; and though the data from this second group have not yet been formally reduced, the researchers say the results appear to be consistent with their initial findings. When yet another ten students have been given the same training, the project will proceed to another stage. "Here," Dr. Green says, "a new group of students will be observed for a much longer period of time. An effort will be made to see whether they can *program* unconscious processes, much in the way that Louisa May Alcott did with her 'letters' to the subconscious, in order to work out problems that need to be solved in each of their own lives. First they will learn, we hope, to listen to their subconscious minds, as the students in our present project have. Then we hope that, with the proper encouragement, they will be able to communicate with the unconscious in a structured fashion." In addition, hypothetical problems will be presented to see whether theta training is of benefit in solving them. For comparison, Dr. Green proposes presenting the same problems to a control group consisting of individuals trained only in the production of beta waves.

Part of the project now includes teaching clinical applications of biofeedback techniques. Whether the theta experience itself will be utilized as part of a therapeutic regime remains to be seen. Nevertheless, it is apparent that an important new avenue to the subconscious has been opened.

That strangely lighted field of grain, with its enchanted, silent movement, is the recurrent centerpiece of my internal landscape. Suddenly, out of a chaos of noisy and strident images, it looms—cool, remote, beckoning. Sometimes the female figure with the cape will be there; other times the field remains empty. ■ The experience is always thrilling. Sometimes I wait, willingly, for 30 or 40 minutes, before there is that characteristic feeling of *déjà vu* as the light bulb goes on and I experience a literal insight, visualizing what has occurred, perhaps a fraction of a second before, in the subconscious mind. It is sheer hedonism, drifting from one electronically cued epiphany to another, wallowing in the sensation of an expanded and expanding humanity, gathering about one's self a sense of minor hubris, exulting in the knowledge that just a few cycles away from the lockstep of everyday life there exists a world of seemingly infinite possibility and exalting complexity. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Are you laying out good money for home repairs you could easily be doing yourself?



There are an enormous amount of fix-it, clean-it, and build-it problems around your house and grounds that *you* could be handling yourself. Like putting down your own flooring at huge savings. Doing your own wiring in complete safety. Wallpapering your bathroom like a professional. Burglarproofing your home, arranging storage space in the attic, maintaining furnishings, clothing and equipment, and much, much more.

The easy-to-follow instructions in the HOUSEHOLDERS' ENCYCLOPEDIA will show you how to do these and hundreds of other household jobs efficiently and safely.

You don't have to be a mechanical wizard. Now there is a way to circumvent the workman's expensive housecall. Even the most inexperienced man or woman can fix, build, organize, and care for everything around the house (or apartment). The clear step-by-step diagrams and drawings in this comprehensive guide show exactly how to handle countless household tasks.

It's easy to use. All entries in this invaluable book are alphabetically arranged for your convenience — from asphalt paving to window panes — and virtually every possible emergency and everyday problem is covered.

Whether you own or rent a house or apartment, get THE HOUSEHOLDERS' ENCYCLOPEDIA and refer to it daily. You'll not only begin to save time and money immediately — you'll discover, perhaps for the first time, what the pride of "doing it yourself" is all about.

Ten-day examination offer

You are invited to examine THE HOUSEHOLDERS' ENCYCLOPEDIA at your leisure for 10 days — and then, if you're not completely satisfied, return it for full refund. $9.95, now at your bookstore, or mail this coupon, with remittance, to Saturday Review Press, Order. Dept. SR-21, 380 Madison Ave., New York, N.Y. 10017.

MAIL THIS COUPON TODAY

To your bookstore or
SATURDAY REVIEW PRESS
Order Dept. SR-21,
380 Madison Ave.,
New York, N.Y. 10017

Please send me___copy(ies) of THE HOUSEHOLDERS' ENCYCLOPEDIA by Stanley Schuler and Elizabeth Meriwether Schuler @ $9.95. I enclose my check or money order (including 42¢ for postage and handling plus sales tax where applicable). I understand that if not satisfied, I may return book(s) within 10 days for a full refund.

Name_____

Address_____

City_____

State_____ Zip_____

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LIFE SCIENCES

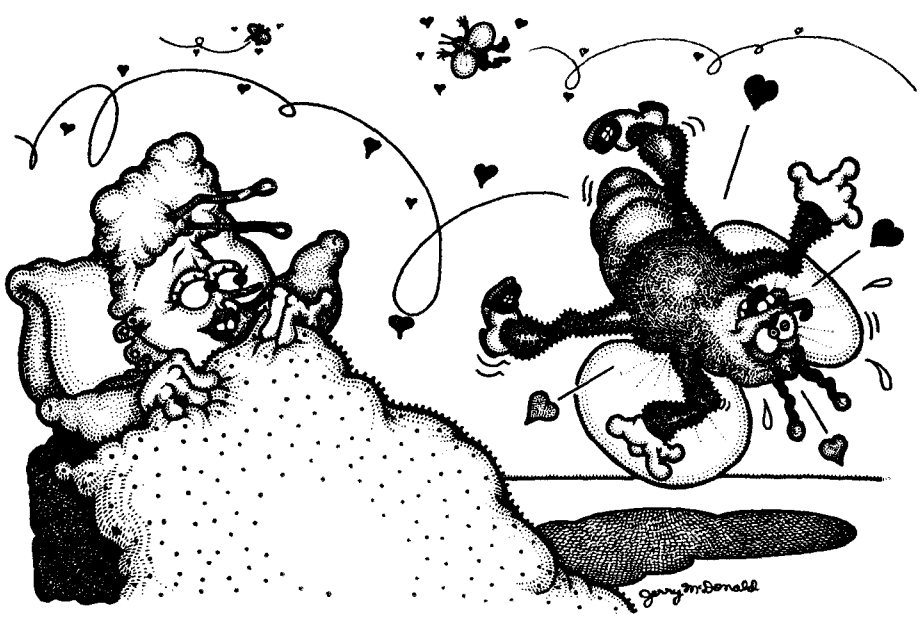
Super Sexed Houseflies

The irritating buzz of the ubiquitous housefly may soon take on a new intensity, thanks to a clever bit of chemical detective work at the University of Toronto. Dr. Otto Meresz and graduate student Cecilia Mozsgai have succeeded in synthesizing a strong sex attractant for these worldwide pests. The chemical is so potent that male houseflies in the vicinity appear to have no interest in, or energy left for, female flies that they may subsequently meet.

"Even if one is trying to be modest," says Dr. Meresz, "the latest achievement is one of global importance. Many countries of the world, especially those with warm climates, are still infested with houseflies that are known to be carriers of typhoid, tuberculosis, and some 30 other diseases."

In 1971 Meresz and Mozsgai succeeded in developing a sex attractant just like one that is manufactured by the insects themselves. The new super-attractant, however, does more than attract; it so dazzles the senses that intercourse ceases and entire colonies of flies become extinct within several generations. When the researchers attempted to raise a colony for experimental purposes in the Lash Miller Chemical Laboratories at the university, where the synthesis had been accomplished, they found that flies failed to reproduce because of leftover traces of the chemical that pervaded the rooms. The testing was therefore done at Queen's University in Kingston, Ontario.

Increasing numbers of scientists, stimulated by the publication of *Silent Spring* and by the growth of the environmental movement, are exploring means of controlling insect pests by turning their own natural processes against them. Genetic warfare and growth inhibitors are proving increasingly effective. Sex attractants—and repellents—are particularly useful, because insects have extremely sensitive organs of smell and often depend upon volatile organic messenger substances for mating and other activities. After having been at war with insects since the biblical plagues, man is finally turning from technological tricks, such as DDT, to more "natural" and insidious means of tampering with the daily habits of his competitors. □



Ionic Blues

Ever feel run-down in heavy traffic? Lethargic in a smoke-filled room? Gloomy about life in the cities? It now seems that there is good reason for people in such settings to feel inefficient, dopey, and even headachy. According to Berkeley's Albert P. Krueger, the feelings are due to a shortage of charged atmospheric particles called air ions, and the shortage is caused by air pollution.

Ions are unstable atoms or molecules with either more or fewer electrons than normal. Ions may form, for example, when an oxygen atom is hit by a cosmic ray, a particle of light, or even another molecule. Normally, the ion immediately combines with four to six molecules of water vapor in a loose association that forms an air ion. Hence there are many air ions around waterfalls and showers.

Most air ions, however, are formed, not by incoming cosmic and electromagnetic radiation from the sun, as is commonly supposed, but in soil. Earth soil everywhere contains varying amounts of radioactive elements, such as radon, uranium, and potassium. Radiation from the elements constantly bombards nearby atoms, dislodging electrons. (Because electrons bear a negative charge, an atom or molecule with an extra electron is a negative ion, while one that has lost an electron is a positive ion.)

These ions are unstable because negative ions are eager to give up an electron and positive ions to add one. Their life-span in clean air is normally about five minutes. They may be destroyed by colliding with another particle in the air or by striking the surface of the earth. Since air polluted with just about anything—smoke, dust, auto exhaust—provides myriad collision targets, the normal five-minute lifetime of an air ion is considerably shortened, resulting in air-ion depletion.

For the past 17 years Dr. Krueger, now professor emeritus of bacteriology, has studied the phenomenon of air-ion depletion; he is particularly concerned about its effects upon all forms of life. For example, mice kept in a de-ionized

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

area are twice as susceptible to influenza as are normal mice. The growth of plants is retarded, and leaves tend to soften and droop. Other physiological changes occur in protozoa, insects, and even man. "The smoke-filled room traditional to politics," says Krueger, "is certainly not the best environment for rendering decisions."

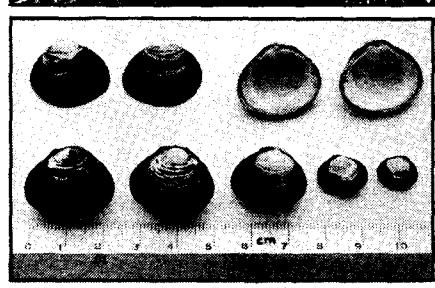
An office experiment conducted in Hungary has illustrated the effects of human activity upon air ions. Four workers shared an office whose air in the morning contained about 2,000 ions per cubic centimeters; several of them smoked. By noon *no* air ions could be detected.

There also seems to be some relevance of Krueger's work to certain dry-air storms, such as the mistral of France, the sharav of Israel, and the Santa Ana of California. Before these storms, positive air ions increase. At the same time the level of a human nerve hormone called serotonin rises. Scientists are attributing an increasing number of activities to this hormone, including constriction of blood vessels and production of pulmonary hypertension. Serotonin may also distort pleasure signals from the brain and slow the healing of wounds. Thus, ion disturbances may be related to both the rise in human illness and the legendary increase in strange and even criminal behavior 10 to 12 hours before these storms.

Krueger, using positively and negatively charged metal plates, can vary the amounts of positive and negative ions in his laboratory to study the effects of such variation upon different life forms. He also takes his own advice in the working areas. Using a tritium (radioactive hydrogen) emitter of beta radiation, he maintains a high concentration of ions in his lab: about 1,000 ions per cubic centimeter, essentially that found in the clear, invigorating air above an alpine meadow. "This seems to be the ideal level," he says. "We work best this way." □

Chinese Clam Invasion

As might be expected, the Chinese freshwater clam *Corbicula manilensis* has no natural predators to check its spread in this country. First discovered in the United States in 1938 by an amateur shell collector along Oregon's Columbia River, the half-inch beast was found in California in 1945. It then spread eastward. By 1971 it had reached Georgia's Altamaha river system. Now, report Samuel Fuller and Charles Powell, Jr., of the Academy of Natural Sciences in Philadelphia, *Corbicula* has nestled into the mud of the Delaware River between Philadelphia and Trenton and threatens to proliferate in watercourses throughout the East.



Clams in Delta-Mendota Canal

Corbicula really made its reputation in California. In June 1951 the Bureau of Reclamation completed construction of a 113-mile-long canal between Tracy and Mendota. The Delta-Mendota Canal was designed to carry as much as 4,600 cubic feet of water per second to the rich but dry farmland of the San Joaquin Valley, the nation's richest agribusiness complex. When the canal was partially "dewatered" just over a year later, engineers noticed that extensive mud bars along the bottom were packed with dense communities of Chinese clams. The proliferating mollusks were also choking the Tracy Pumping Plant, as well as sprinklers, ditches, and pipes throughout the irrigation system. In 1969 the canal was dewatered, and bulldozer operators labored for 45 days to remove 50,000 cubic yards of clams.

Conchologists may never know exactly how *Corbicula* got to this country, but the best guess is that Chinese immigrants from Canton brought it to California in the 1880s. The Cantonese regard the mollusk as a "good luck clam," and it is a dietary staple in many parts of Asia. In this country it is of interest primarily to the fishermen who use it for bait. The spread of *Corbicula* is undoubtedly hastened when fishermen dump unused buckets of clams into waterways. The creatures also hitch rides with shell collectors and river dredges.

The clam continues to appear in new locations, crowding out other forms of native underwater life. It is now so abundant in midwestern rivers that cement can no longer be made with gravel contaminated with these shells. R. Tucker Abbott, head malacologist at the Delaware Museum of Natural History, estimates that in two or three years clam densities in the Delaware River will approach those observed in California in 1969. Scientists fear that *Corbicula* may next invade Chesapeake Bay and even the Hudson and Connecticut river systems. □

Diet vs. Arterial Fat

The medical establishment, including notably the American Medical Association and the National Academy of Sciences, has finally agreed that diet—specifically the kinds and amounts of fat consumed—plays a crucial role in determining a person's chances of incurring heart trouble. Most doctors agree that the buildup of fatty deposits on the walls of arteries is due in part to the consumption of excess fatty acids, particularly cholesterol; such a buildup tends to result in arteriosclerosis and even heart attacks.

Scientists have now shown that it is possible to reverse such a buildup, at least in animals. In an 18-month experiment with monkeys at the University of Chicago, Dr. Draga Vesselinovitch found that a low-fat, low-cholesterol diet "results in a prompt and sustained low serum cholesterol level and a substantial reversal of advanced experimental atherosclerosis."

If low-fat diets can similarly be shown to reverse the buildup of arterial fat in humans, there may be some quick changes in eating habits. Equally important, there will also be a sharp increase in pressure against the nonsensical legal barriers that currently prohibit substitution of low-fat ingredients for saturated fats in meat, milk, and other foods. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

SOCIAL SCIENCES

Pseudo-Research?

Dr. Thaler, a professor of psychiatry at the University of Rochester Medical School, requested space to respond to an article by David Perlman in SR of The Sciences, *March. The article criticized psychiatric diagnosis and care, describing an experiment by David Rosenhan of Stanford University in which "sane" persons working with Rosenhan were considered "insane" by the admissions boards of several mental hospitals.*

David Perlman uncritically reports on Rosenhan's study of psychiatric inpatient facilities in which he used eight "pseudopatients." In my opinion, the data gathered by the pseudopatients is pseudo-data, based on pseudo-observations. What is genuine about the study is the stir it caused in the national media. Although some of the conclusions reached by Rosenhan are valid within certain limits, none can be reasonably inferred from the study as designed or from the data as reported. A few disturbing points:

- *On diagnosis:* The classification of psychiatric illness, by which I mean the labeling system used in the profession, *is* imprecise and unreliable. This lack of a specific terminology does not imply, however, the inability to identify psychiatric illness when it exists, nor does it imply that anxiety, depression, psychological suffering, go undetected. Rosenhan's own nomenclature is quite confused—he asserts that the psychiatric profession is unable to distinguish "normal from abnormal," "sane from insane" (emotionally laden terms that do *not* exist in psychiatric terminology), while he makes glib claims of being able to readily identify behavior that is "odd" or "deviant" (terms even more vague and value-laden than the ones he criticizes).
- *On treatment:* There *are* many psychiatric institutions in this country in which care *is* inadequate; there are some in which care is dreadful. But the existence of such institutions does not entitle Rosenhan to generalize about all psychiatric hospitals. He provides us with no data by which we can judge how varied were the 12 institutions visited by the pseudopatients. It should be pointed out that most of the shortcomings he describes are due to inadequate staffing; the complete phasing out of federal funds for psychiatric training seems to augur even harder times.
- *The pseudopatients:* We are told very little about them except that three of the eight were *not* in the mental health professions. The three psychologists were not identified as to their clinical experience—were they rat or people psychologists? Furthermore, we are told "many" of these pseudopatients had never visited a psychiatric ward before! How could they gather valid data about such a complex social system? We are assured that these observers were all perfectly normal psychologically. By what criteria was this judgment made and by whom? It is difficult to believe that anyone engaging in research in the social sciences can be this naïve about the pitfalls of participant-observer research.
- *Admissions procedures:* We are told nothing about the procedure followed by the admitting institutions. The institution with which I am associated—a 107-bed unit, part of a general hospital in a university medical center—is not unique. As with many other institutions, there is often a waiting list for inpatient beds. No one is admitted merely because he wishes admission. Anyone who demonstrates the ability to work and to love, as the pseudopatients are said to have done, would find it very difficult indeed to be accepted for other than outpatient care.

In-hospital problems often consist of persuading patients that they are ready to leave the hospital rather than compelling them to stay: while in the hospital, patients go on increasingly prolonged home visits, go to school, to work, or to look for jobs. Staff meetings consist of agonizing discussions about how staff behavior might have produced disturbances in patient behavior. Problems even arise from *over*-exposure to staff members.

Another point that the study ignores is the fact that a great many institutions—including some of the kind that the study purports to have sampled—admit most of their patients on a voluntary basis. Of our own 1,400 to 1,500 admissions per year, as many as 80 to 90 per cent are admitted voluntarily and may leave any time they wish.

I am deeply concerned, as are many of my colleagues, about the state and the fate of psychiatric care in this country. The wide dissemination of this kind of spurious study is productive of fear and mistrust in those who need psychiatric help. It makes more difficult the work of those trying to deliver high-quality care.

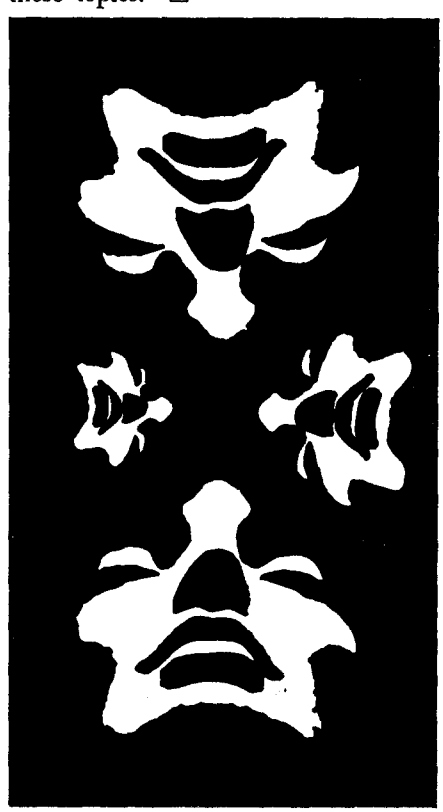
OTTO F. THALER, M.D.

Female Troubles

A common notion among members of the medical profession is that "female troubles" are psychologically based. Although doctors admit the pain is real, they tend to ignore the possibility that its roots are physiological. This attitude has been attacked by two New Zealand doctors, Jean and John Lennane, in a recently published article in *The New England Journal of Medicine*.

The Lennanes criticize the notion that cramping before or during menstruation, for example, occurs primarily in "high-strung," nervous, or neurotic women. Instead, they argue, dysmenorrhea, as the syndrome is called, is dependent upon ovulation, though the exact cause is not known. Other problems generally linked to psychological imbalances in women are morning sickness (attributed to anxiety about pregnancy), severe labor pain (tension and fear), and colic in infants (often viewed as a reaction to the mother's conflicts about her role).

The Lennanes conclude that "treatment directed at the psychic 'cause' is a waste of time and money." Although "it is tempting to postulate an underlying sexual basis for this prejudice," they write, doctors should simply apply "normal objective scientific methods to these topics." □



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

PHYSICAL SCIENCES

Atomic Art Appraisal

Exposing a contemporary forgery of a Rubens or a Giotto is usually a simple matter, because the imitator necessarily used different materials from those of the master. Spotting a forgery of a more recent masterpiece—from the late 19th century, for example—is considerably more difficult, because supplies available then can be easily duplicated today.

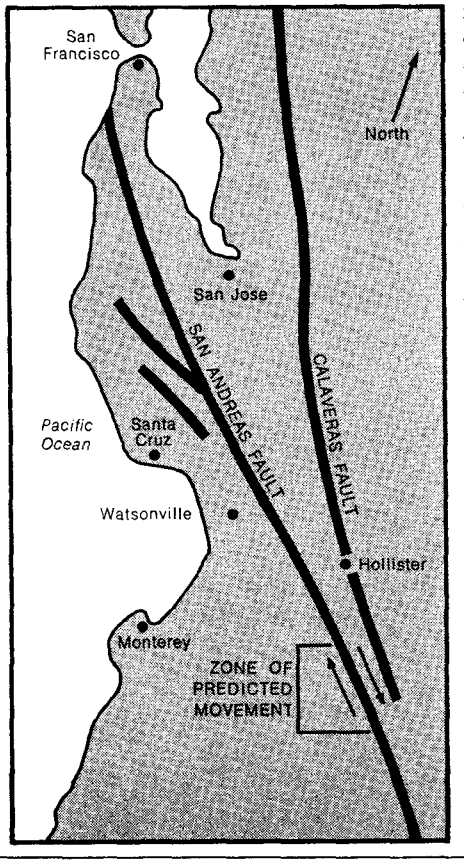
Recently, however, the National Gallery of Art and Carnegie-Mellon University have devised a solution. Dating techniques based on the radioactive isotope carbon-14 now can be used to authenticate a work of art.

Strangely enough, these techniques are possible because of atomic bomb testing in the atmosphere. Normally, carbon-14 techniques are used to date archaeological finds—but then only to within a few centuries. Because of the bevy of atomic bomb tests since the end of World War II, however, carbon-14 levels in a variety of substances —including linseed oil, canvas, and other art materials—have increased dramatically. Thus, because a painting produced during the last quarter century contains more carbon-14 than do earlier works, it is relatively easy to detect a modern forgery masquerading as a 19th-century masterpiece.

FRANK CHILTON

A Quake Predicted

A stroll through the streets of Hollister, California, is enough to show most people why it deserves the informal title of Earthquake Capital of the United States. Street paving is cracked, curbs are offset, and masonry bears the scars of seismic shaking. The Almaden winery south of town is being torn apart by persistent tiny movements of the San Andreas Fault.



It is therefore appropriate that the first "official" earthquake prediction should pinpoint a 12-mile stretch of the fault just south of Hollister. Before last month such warnings were offered by a variety of well-meaning amateurs. This forecast, however, is the first from serious scientists, based upon careful monitoring of fault activity by U.S. Geological Survey seismologists headquartered in Menlo Park.

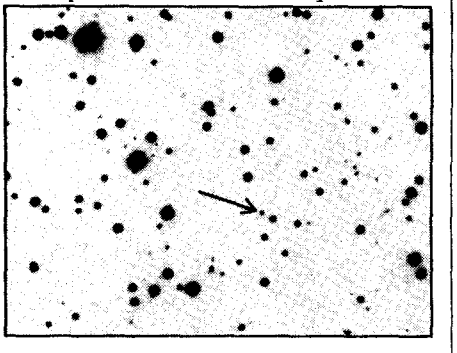
Doctors Robert Wesson and William Ellsworth have derived the prediction from two lines of evidence. The first clue is a recent swarm of micro-earthquakes along the fault zone. A number of geologists have associated this behavior with impending seismic activity. The second indicator consists of empirical probability: in studying this region, the scientists have noticed that four moderate earthquakes, ranging from magnitude 4.0 to 5.0, have occurred since December 1971. One segment along this route, however, has remained locked. A moderate quake here would fill a statistical "gap."

Although the current experiment in prediction is relatively simple, it represents an important symbolic step. If such predictions can be made accurately in both time and space, they will do more than warn nearby residents to be on their guard. If seismologists know when quakes are coming, they can, in theory at least, learn to prevent them. Certain human activities—underground nuclear blasts and the injection of fluids into deep wells—have already been found to release accumulated fault strain. If we know when such strain is reaching a critical point, it may some day be possible to release the strain by means of a small or moderate quake that does little damage. □

Far-Out Quasar

Quasars have been at the center of cosmological debate since their discovery a decade ago. According to traditional astronomical rules, they seem to be the most distant and energetic objects in the universe. Two astronomers at Steward Observatory of the University of Arizona, working by these rules, have just reported that they have found a quasar farther from earth than any other known object. "In effect this pushes the current limits of the visible universe deeper into space," says Peter Strittmatter, who, with Robert Carswell, discovered the quasar.

The almost incomprehensible velocities and distances attributed to quasars are thought to be proportional to the distortion of their light signal, a phenomenon known as red shift. Astronomers prefer to talk about quasar distances in terms of red-shift number, because its relation to mileage is still in dispute. The Steward quasar, designated OH471, shows a red-shift value of 3.4, far greater than the next largest shift of 2.88, found in 1970 by Kitt Peak National Observatory scientists. By red-shift rules, OH471 is traveling at nearly the speed of light and, depending upon the curvature of the universe, is more or less 10 billion light years distant.



Quasar OH471, perhaps the most distant object from earth

Or is it? A growing group of cosmologists dispute the interpretation of the red-shift phenomenon. The red-shift rule was largely formulated in 1929 by Edwin Hubble, who said that the larger the shift, the greater the distance and velocity of the observed celestial object. Although the red shifts of a few nearby quasars have been verified because of their association with well-known galaxies, some scientists argue that the farthest quasars may not follow the Hubble rule. Halton Arp of the Hale Observatories in California,

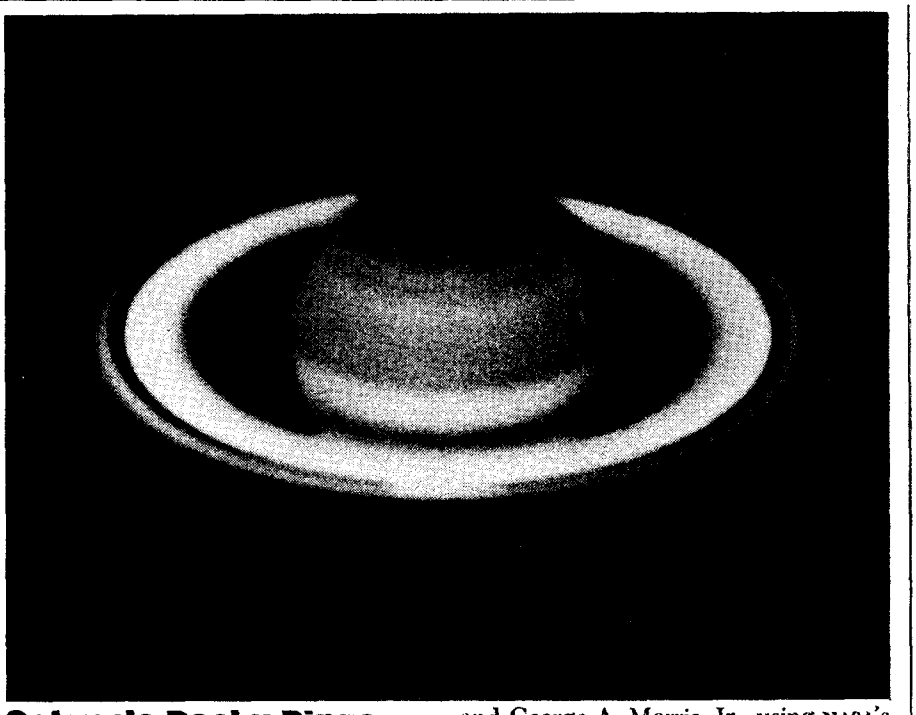
PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

for example, asserts after six years of work that quasars are more likely to be the results of spectral tricks or poorly understood gyrations in nearby galaxies.

More recently, William Tifft, who, ironically, is a colleague of Strittmatter and Carswell at Steward, questioned the validity of the red-shift yardstick. After surveys of more than 100 bright galaxies in the Coma Cluster and of 150 quasars, Tifft finds an unexpected grouping of red-shift values. The grouping implies that something other than velocity and distance is causing the red shift; otherwise the values would be distributed smoothly. Tifft cannot yet account for this. He suggests, however, that the grouping represents quasars in various stages of evolution millions of years ago. Although the internal behavior of quasars is a complete mystery, Tifft speculates that the red shift may be a function of the fundamental properties of atoms rather than of great velocities of remote objects. This interpretation questions the classic theory of an expanding universe that is supposed to have originated with the "big bang" of a primeval fireball.

"I'm quite convinced that this banding pattern is not an accidental thing," says Tifft. "If it were due to chance, then it would be a most remarkable accident in terms of random correlation of points which have nothing to do with each other. I have a feeling that cosmologists have been exceedingly naïve about the vastness and complexity of the universe if they think it can be simply explained with a big bang and expansion." After hearing Tifft's argument, a colleague commented, "The fact that there are so many heretics in astronomy today is the sign of a healthy science."

ELIZABETH MAGGIO



Saturn's Rocky Rings

Radar astronomers from the Jet Propulsion Laboratory in Pasadena, California, recently completed the first radar probe of Saturn, the second-largest planet in the solar system. The fact that no echoes were detected from Saturn itself lends support to theories that the planet is gaseous and may not have a solid surface. Echoes from Saturn's rings, however, were astonishingly strong; this suggests that the rings are made of solid chunks, at least a yard in diameter. Until now it was generally believed that the rings consisted of tiny ice crystals, dust, and gas.

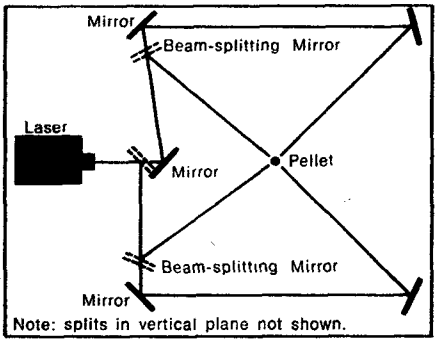
The first successful radar bounce over the 700-million-mile distance was performed by Richard M. Goldstein and George A. Morris, Jr., using NASA's 210-foot Goldstone antenna in the Mojave Desert. "We received much stronger bounce-back signals [from the rings] than we expected from such a distance," said Goldstein. "Our echoes indicate rough, jagged surfaces, with solid material—perhaps rock or metal—one meter [3.3 feet] or larger. Perhaps much larger."

These findings contradict a 1970 report prepared for NASA, which held that Saturn's rings would present "negligible danger" to spacecraft. According to Goldstein, this solid material "must be considered an extreme hazard to any spacecraft sent into or near the rings." Luckily, the Mariner spacecraft scheduled to fly by Saturn in 1981 will give the rings a wide berth. □

Laser-induced Fusion

For years scientists have thought that the intense heat of lasers could be used to induce thermonuclear fusion—the union of atomic nuclei to produce heavier nuclei and release enormous quantities of energy. Once realized, such fusion might provide the world with a cheap, abundant source of energy.

Recently, in time for a meeting of the American Physical Society in New York, the Lawrence Livermore Laboratory disclosed technical details of parts of their laser-induced fusion research. Computer calculations from the lab indicate that for efficient fusion the light beam from an infrared laser should be split into six beams that simultaneously strike a pellet of deuterium and tritium (both heavy isotopes of hydrogen) that is one millimeter in diameter. The laser light then compresses the spherical pellet to 1/25 its original size, increasing its density to 100 times that of lead. As a result, the temperature of the pellet rises to one billion degrees centigrade—100 times the fusion-produced temperatures of the sun. The energy yield of each pellet would be about 25,000 calories, enough to burn a 100-watt light bulb for 290 hours.



Much of the motivation for fusion research springs from the need for more and more sources of energy. There is enough deuterium in the world's oceans to provide fusion energy for millions of years, whereas oil, gas, and coal supplies may be gone within a century. Also, the nuclear *fission* reactors available today have a limited future, because their energy comes from the fission, or splitting, of heavy, depletable elements, such as uranium. Even new reactor designs that "breed" more fissionable fuel appear to have less long-range promise than fusion has.

Although laser-induced fusion seems to offer a solution, its realization is years, perhaps decades, away. First must come new lasers with 10,000-fold increases in energy, more pulses per second, and efficiencies 100 times higher than those of existing instruments.

FRANK CHILTON

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

HEALTH & MEDICINE

Unraveling the Split Personality

For some time mental health researchers have known that schizophrenia, a complex and puzzling behavioral disorder affecting some two million persons in the United States, is at least in part genetically transmitted. But the likelihood of finding chemical irregularities that might be used to identify individuals who are susceptible to the mental disease seemed small until last year.

Then a research team at the National Institute of Mental Health noted that the activity of monoamine oxidase (MAO), an important enzyme of the nervous system, was markedly lower in schizophrenics than in other mental patients or in normal individuals. Despite the initial excitement, however, a key question remained unanswered: Was this abnormality present before schizophrenic symptoms developed, or was it a result of diet, hospitalization, drugs, or even a secondary effect of schizophrenia itself? Only if the low enzyme activity was found to be present before the disease developed would psychiatrists have a way of identifying persons vulnerable to schizophrenia before it actually developed. If this proved to be the case, they might even have an important clue to the cause of the mental disorder itself.

Two months ago the same NIMH team, headed by Doctors Robert J. Wyatt and Dennis L. Murphy, reported in the journal *Science* that the low MAO activity might indeed be an inherited trait marking vulnerability to schizophrenia, and not an effect of the disease process. For their research Wyatt and Murphy selected 13 pairs of genetically identical twins. In each pair one twin was known to have schizophrenia; the other had never shown any signs of it. Blood samples were taken from these subjects and from 23 normal, non-twin controls. The activity of the monoamine oxidase from the blood platelets of all the twins, both schizophrenic and non-schizophrenic, was found to be significantly lower than in the controls. This was a strong piece of evidence indicating that the low enzyme activity is genetically determined.

Because the twins who never showed any symptoms of schizophrenia also had abnormally low MAO activity, the researchers are rightfully reluctant to use MAO activity alone to predict incipient schizophrenia. However, they do assert that the "lazy enzyme" indicates a vulnerability to schizophrenia that may be set off by other factors.

Like much other medical research, the MAO finding raises as many questions as it answers. How is MAO activity —or lack of it—related to schizophrenia? Is the MAO abnormality really transmitted in the genes, or is it a result of some prenatal or early childhood influence? Whatever the answers, the connection of the lazy enzyme with schizophrenia will serve as a useful tool in diagnosing a disorder that is often exceedingly difficult to identify. □

Tooth Cement

Dentists won't have to do as much drilling, or patients as much suffering, if a new kind of tooth cement lives up to a glowing description in *Chemical & Engineering News*. Not only does it look like real dental enamel; it combines directly with tooth surfaces. Thus, it is likely to last indefinitely and may be used to fill—without drilling—natural fissures on molar surfaces as well as those tiny cavities that occur at the gum line.

Surprisingly, conventional cements have changed little since their development in Germany around 1903. They are prepared by fusing silica glasses with phosphoric acid. This is a harsh mixture, which can damage a tooth; consequently, a cavity must be lined to protect the tooth against its own filling. In addition, such cements are not adhesive and will remain in place only if anchored by a good deal of undercutting in the tooth.

The new cements, called ASPA (for aluminosilicate polyacrylate), grew out of several years' work at the Laboratory of the Government Chemist in London. The basic ingredients—alumina, cryolite, fluorite, and quartz—are fired in an electric furnace at about 2,150° F, shock-cooled, and then ground to a fine powder. The dentist mixes the powder with a 50 per cent aqueous solution of polyacrylic acid. Hardening begins in about five minutes; the final product can withstand pressures of more than 30,000 pounds per square inch. The stuff is so hard, in fact, that non-dentists are contemplating its use for bonding metal and ceramics, and for the cold welding of joints, particularly those that are subjected to boiling-water environments. □

Growing New Limbs

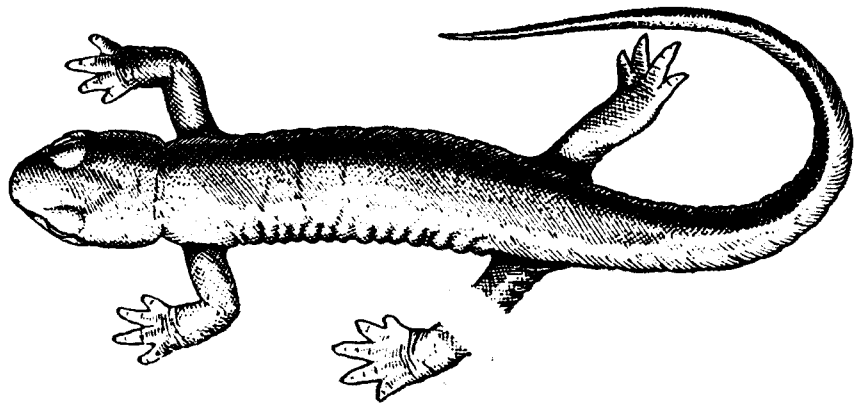
When a salamander loses a leg or its tail, a new one begins growing almost immediately. In fact, the lowly salamander can regenerate almost any part of its body—including as much as 30 per cent of its heart. Although many "lower" animals can duplicate such feats, mammals, including man, generally cannot. Our only remaining vestiges of such basic powers of regeneration are the mending of bone fractures, the healing of injured skin, and, to some extent, the replacement of small portions of the liver that have been either removed surgically or damaged by accident or disease.

Under special conditions, however, animals that ordinarily cannot regenerate missing parts have been coaxed into regaining the ability. What's more, the technique, although still experimental, has begun to find its way into hos-

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

pitals, where it is being used to promote the healing of skin ulcers and to enhance bone growth.

The trick is to duplicate the appropriate conditions in which regeneration is known to take place in lower animals. Dr. Robert O. Becker, a professor of orthopedic surgery at the State University of New York's Upstate Medical Center and an associate chief of staff for research at the Veteran's Administration Hospital in Syracuse, found that a combination of electricity and hormones "turns on" certain cells, enabling them to restore a missing structure.



For instance, Becker discovered that natural regeneration in the salamander starts when injured cells produce a small, localized electric field. This electricity stimulates cells in the damaged area to "dedifferentiate"—to become unspecialized cells called blastocysts. These in turn are then directed, probably by the nervous system, to "redifferentiate" into all the components of the missing structure. Before this process can occur, the hormone prolactin sensitizes the cells so that they are capable of reacting to the electric current. Human cells in test tubes have also been made sensitive in the same fashion.

Much of the salamander's nervous system, which produces the electrical activity necessary for regeneration, is distributed throughout its body, where it is available to initiate the regrowth process. However, this pattern of development does not occur in mammals, which have highly developed nervous systems concentrated in the brain and spinal cord. Therefore the proportion of the electricity outside the central nervous system in mammals is too small to trigger regeneration. The question confronting Becker: Could he supply the correct amount?

In recent experiments, representing some 15 years of research on the subject, Becker used tiny electrodes to supply the missing electricity. Incredibly, he managed to stimulate regeneration of the forelegs in 37 of 39 laboratory rats. Bone, cartilage, bone marrow, muscle, nerves, and blood vessels all regrew as far as the first joint. Why no farther isn't known, but the growth stimulated far exceeds anything else accomplished in this field.

Though Becker himself believes that he has gained access to very basic biological control systems, he isn't about to try growing a human limb until the potential dangers of his technique are thoroughly explored. He has already shown the possibility of growing new cartilage on joints of mammalian bones —something that could be of immeasurable value in the treatment of arthritis. Becker even hopes that electrical stimulation will someday be used to repair the damage caused by coronary artery disease. The heart, rather than forming useless scar tissue, might be stimulated to grow healthy new muscle. □

The Male Pill

Scientists are making a concerted effort to find a chemical agent that would make men temporarily sterile. Believe it or not, what's holding back development of the male pill is, in part, uncertainty—scientists don't yet know the best target for the chemical attack. Is it the hormone control centers in the brain, the sperm-producing tissue of the testes, or the duct known as the epididymis, where the sperm mature? According to research using bulls at Pennsylvania State University, the epididymis is turning out to be one of the likeliest sites where sperm maturation might be interfered with by chemical means.

The epididymis, a 50-foot duct tightly coiled in each testis, has traditionally been regarded as nothing more than a reservoir for sperm. However, physiologists are now discovering that it is one of the most important sections of the male reproductive system—a kind of "finishing school," where infertile sperm leaving the testis become fertile. Rupert Amann, professor of dairy physiology at Penn State, now reports finding that sperm, at least from bulls, probably are nourished during their eight- to ten-day journey through the epididymis by a minuscule droplet of cell cytoplasm, which remains attached to each sperm when it is released from the testis. "When sperm finally leave the epididymis," says Amann, "the content of the droplet is altered or depleted, the sperm's energy production systems are fired up, its membrane is different and has acquired one or more coatings, and—most important—the sperm are fertile."

A very complex series of changes undoubtedly is responsible for this sperm activation. Amino acids, a B vitamin, various proteins, and other agents have been identified in the fluid in which the sperm are suspended while in the epididymis. However, Amann is paying particular attention to the male sex hormones—androgens—within this fluid. Supported by funds from the National Institutes of Health, his latest studies already have shown that the hormones change as the sperm move through the epididymis. These changes, Amann believes, are associated with sperm maturation.

The possibility that sperm must be "activated" in the epididymis suggests an approach to male contraception. "Sperm have their own life cycle," says Amann. "They are formed, mature, and die. At or before death they lose their power to fertilize an ovum. By altering the hormonal balance, using chemicals whose action is specifically targeted on the epididymis, we might make sperm grow old before their time. We might make them dead-on-arrival—infertile."

Not only is the epididymis one of the most promising sites for contraceptive action; it is, Amann believes, one of the safest. "If we try to act on the testis with a drug, we run the risk of altering the genes in any sperm which accidently might be produced." In the epididymis the already-formed chromosomes in the sperm cells are better protected, and the possibility for genetic damage appears far less. □

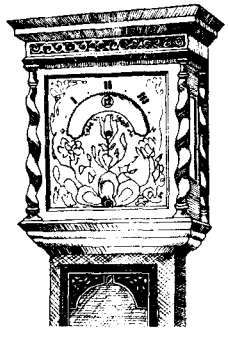
PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

TECHNOLOGY

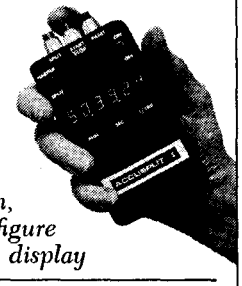
Digital Time

From clock radios to wristwatches, the time world has gone digital, allowing clock watchers to view the time in number form. The craze for easy-to-read time has even spread to stopwatches. A new electronic digital stopwatch gives an instant six-figure readout, eliminating the difficulties of squinting to read those tiny split-second divisions on the face of the old-fashioned mechanical stopwatch.

Developed by Harper Time and Electronics of Mountain View, California, the new hand-held stopwatch provides hundredth-second timing with a high degree of accuracy. Sports, science, and industry enthusiasts eager to purchase this digital timer, with its quartz crystal oscillator and integrated circuitry, must be willing to invest a steep $175. (Those old mechanical stop-timers still cost as little as $20.)



1680
Night clock of King Charles I, an elegant precursor of digital time



1973
Electronic digital stopwatch, with instant six-figure illuminated time display

The boom in digital clocks is a recent consumer phenomenon, but the digital approach probably dates back to a "night clock" made by English clockmaker Joseph Knibb in about 1670. In this original digital clock, big Arabic numerals, from 1 to 12, were painted on shells. One could tell the time by reading the hour through a window in a metal plate, which slowly rotated from left to right across an arc divided into four quarters with minute divisions in between. At night a lit candle was placed inside the clock to illuminate the number from behind. In 1680 King Charles I was sufficiently intrigued by the digital clock to have his court horologist, Edward East of Fleet Street, construct a six-foot, ten-inch digital grandfather clock with a place in the back for a candle. Cost: not known. □

Tagging Oil Spills

It's tough to catch a criminal, particularly one who's guilty of dumping oil into oceans or rivers. Of more than 8,000 oil spills recorded in the United States by the Coast Guard in 1971, about one-fourth were from unknown sources. Chemical engineers at the California Institute of Technology have now devised a system for tagging oil that could make it easier to track down these elusive polluters.

The core of the system, described in *Environmental Science and Technology* by Berill Mitchell, Peter Simmonds, and Fredrick Shair, is a microcapsule filled with liquid. By using varying amounts of only 20 different liquids, the engineers can brew more than a million distinctive formulas for their tiny plastic balloons. Since each balloon is only one eight-hundredth of an inch wide, it can accompany the oil wherever it goes; small-scale field studies indicate that the plastic sheath is durable enough to last the life of an oil spill. If each petroleum shipment were tagged with these minute license plates, the source of the oil on a gummy beach or sticky seabird could quickly be identified.

Phosphorescent or radioactive particles have also been suggested for tagging oil shipments. Another technique proposed by scientists working for General Electric is to seed oil cargoes with "invisible" metal particles of varying magnetic properties. With only 11 variations of ferrite mix (iron, zinc, nickel), over 2,000 different combinations, or codes, can be arranged. Although the magnetic particles, measuring about a millionth of an inch in diameter, are much smaller than the Caltech microcapsules, the cost for magnetic tagging seems considerably higher. GE researchers estimate that $2,500 worth of ferrites would be required to tag the oil in a single 100,000-ton tanker. For the same vessel only about one pound of microcapsules would be needed, estimate the Caltech engineers, costing less than $100.

William Lehr, a Coast Guard commander concerned with pollution prevention, points out that "ensuring proper addition of tags by each source would be a tremendous operational problem, since international cooperation would be required to set up coding procedures." Caltech chemical engineer Fredrick Shair agrees that administration will be difficult but "certain environmental problems will *only* be solved through some level of international cooperation." Oil companies could voluntarily tag their oil if only to show the public they weren't responsible for a certain spill. In addition, the microcapsule tagging technique, according to Shair, might be adapted to help track the flow of illegal drugs or explosives. □

Microcapsules, enlarged about 500 times

A New Voice

The laryngectomee population in the United States is currently more than 25,000, increasing by 3,500 annually. After having the larynx (voice box) removed, usually to halt the spread of cancer, many of these patients struggle through long months of trying to learn to speak again. More than one-third do not succeed. Those who fail have traditionally been faced with two alternatives: complete silence or the use of an electronic device that produces an unnatural-sounding voice when held against the throat.

A new prosthetic aid called VoiceBak now offers to restore near-natural speech without having to be held and without the need for training. Developed by Dr. Stanley Taub of New York Medical College, the lightweight plastic device is fitted externally by a surgeon into openings made in the esophagus and trachea. It is operated mechanically by the patient's own wind and doesn't interfere with normal eating, drinking, or swallowing. Nine laryngectomees already fitted with VoiceBaks have been able to whisper, shout, sing a full octave, and count to 20 on a single breath. LaBarge, Inc., of St. Louis is offering the device to surgeons for $950. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

BOOKS

Thicker Than Water

BY ALAN ANDERSON, JR.

BLOOD. By Earle Hackett. Illustrated. 288 pages. Saturday Review Press. $9.95.

Life consisteth in blood; blood is the seat of the soul; therefore the chiefest work of the microcosm is, to be making blood continually.

—François Rabelais

This book makes a strong case for Rabelais's encomium. Indeed, it leaves the distinct impression that practically every transaction of importance occurs in or is influenced by what could be called the body's largest organ. Earle Hackett's intention in this book is to create a bridge between hematology (the scientific study of blood) and hematosophy (or "traditional bloody wisdom"). We learn, for example, that while indeed you cannot get blood from a stone, you can at least get artificial blood from plastic. We are also reassured that spinach is reasonably rich in iron, but that to rely on it exclusively for our iron intake, we would have to consume our own weight in *épinards à l'anglaise* every year.

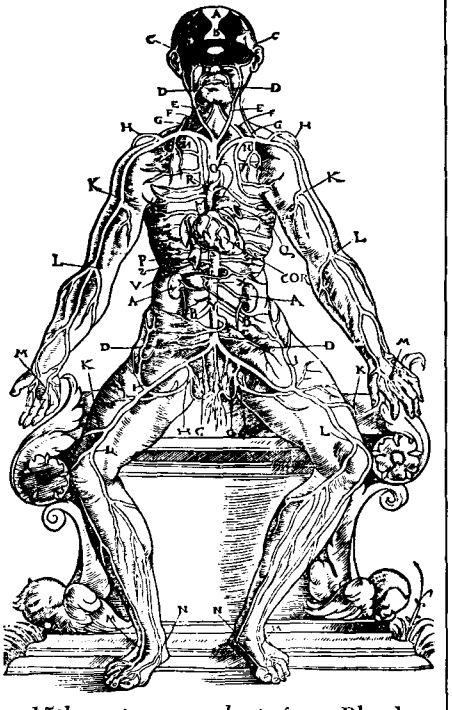
Then there are the astounding facts: the surfaces of our red blood cells, if peeled and flattened, would cover ten tennis courts; the capillaries of an adult would, if linked end to end, stretch more than once around the world; each corpuscle must travel about a mile a day through tight capillaries and rushing arteries. After three to four months of such wear and tear, each is unceremoniously consumed by scavenger cells in the spleen. This operation involves some three million red cells each second.

Daily housekeeping in the blood is incredibly complex. Each of the body's 100 trillion cells must be visited regularly, cleaned, nourished, and protected against disease. Each red blood cell, bearing 300 million hemoglobin molecules, must haul one billion molecules of oxygen after each passage through the lungs. The body quickly feels failure to do this: the brain would stop functioning in three or four minutes, for example. To insure the necessary circulation, we each come equipped with a fist-sized, 1/250-horsepower engine putting out one to eight gallons a minute 40 million or so times a year for 70 years.

Alan Anderson, Jr., is a senior editor of SR of The Sciences.

The enchanting feature of this book, and the key to its readability, is Hackett's device of tracing the trail of science in and out of folklore. The discussion of warm-bloodedness, for example, is introduced by the myth of the dragon and the elephant as recounted in Pliny the Elder's *Natural History*, "a great storehouse of ancient errors." In leading up to the discovery of the circulation of the blood, Hackett discusses the theories of the Greek physician Galen the Serene, who, though at times innovative, "was to stultify progressive thought on the structure and function of the human body for more than a thousand years."

We learn that blood biology, fittingly enough, figures prominently in legal



15th-century woodcut, from Blood

cases. Settlement of paternity suits, for example, may be blood-based: if a blood-group-A woman has a B-group baby, a man of group A or O cannot possibly be the father. If a criminal must get rid of a bloodstain on a towel, Hackett tells him why he must not wash it with hot water: this action denatures, or cooks, the protein in the blood, just as it does in a hard-boiled egg; he should soak it in cold water, which streams osmotically through the semipermeable membranes of the red cells and causes them to burst and lose color. Then there is the case of the partially decomposed body found floating in water: drowned, or killed and then tossed into the river? A blood expert would know that a drowning victim inhales some water, along with unicellular silica-skeletoned plants called diatoms. The struggle inevitably breaks some blood vessels in the lungs, and diatoms find their way into the circulatory system. They are quickly pumped to such faraway spots as the brain and bone marrow, where they would be detected by a hematologically alert cop.

If the account of this process makes you queasy, the book tells you why. Your surface capillaries empty; the skin sweats and becomes pale and cold, particularly at the tip of the nose. Then you may faint: the heart rate slows, and small arteries relax so that blood "pools" in them; blood pressure drops, flow is reduced, and the brain loses consciousness from lack of oxygen. Likewise, the brave young soldier at parade alert, wearing thick ceremonial dress on a hot day, may be done in by his own blood. While he stands still and straight, his blood pools in the leg veins, which normally require shifting muscular movements to massage the flow of blood back to the heart. Rising body heat causes dilation of skin vessels, and blood pools there, too. As dignitaries pass by the soldier, adrenalin is released, increasing the output of the heart, which empties. With much blood pooled elsewhere, there is not enough returning to the heart for the next beat; pressure drops, and down goes the soldier. In the old days this mechanism was essentially responsible for death by crucifixion; since the victim was nailed upright, blood fell to the legs, causing repeated fainting and finally irreversible changes in the blood-starved brain.

Most of what goes on in the blood, of course, does not meet the eye with the same impact as would a fainting man nailed to a tree or a cross. The microscopic immune system, for example, in charge of surveillance and defense, is probably the most fascinating field now under investigation by blood experts. Imagine: sentry cells patrolling the body must be able not only to recognize foreign invaders but to trigger a molecular emergency resulting in the production of swarms of antibodies. How do these defending antibodies know that a germ is foreign and not part of the "self"? How can the body produce a sufficient variety of antibodies to recognize the countless bacteria, viruses, and other out-

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

EUROPE BY CAR
45 ROCKEFELLER PLAZA, NEW YORK, N. Y. 10020
9000 SUNSET BLVD., LOS ANGELES, CALIF. 90069
SAVINGS ON CAR RENTAL • PURCHASE
FREE 72 pg CATALOG

DIGITAL:THEORY,DESIGN, CONSTRUCTION
LOGIC NEWSLETTER ©
SAMPLE COPY $1.00
LOGIC NEWSLETTER
POB 252
WALDWICK,N.J. 07463

OCEAN FRONT PROPERTY
220′ across the dunes
Westhampton Beach, Long Island
Deep Lot with many Pine Trees
Beautiful Beach
$150,000
BOX 657
WESTHAMPTON BEACH, NEW YORK 11978

IMMANUEL VELIKOVSKY*
Reconsidered
— a ten-issue series

*author, Worlds in Collision

The public deserves a better assessment of the validity of Velikovsky's work than it has received.
—WALTER ORR ROBERTS
Former President, American Association for the Advancement of Science

Contributors include:
- W. F. LIBBY, Nobel laureate
- CARL SAGAN, Cornell University Astronomer
- CYRUS GORDON, classicist

Order your introductory issue today
Send $2.00 to:
Pensee
P.O. Box 414
Portland, Oregon 97207
Name _____
Address _____
City _____
State _____ Zip _____

siders that daily assault the body? Does the surveillance system guard not only against infection but also against cellular irregularities, such as cancer? If so —a question under vigorous investigation now—this could account for cancer as a syndrome of advanced age, since the immune system weakens over the years as unfavorable cell mutations accumulate.

There is much more: transfusions, anemia, vampires, leeches, hemophilia, Rh disease, blood typing, human evolution. Indeed, Hackett estimates that hematology, "grandly conceived," is practically open-ended, comprising perhaps a tenth of all physiology of creatures larger than the flea. "After the blood of man has been dealt with," complains the author, "there will still be the rest of the mammals, and then the rest of the vertebrates, and then the rest of the bloody animal kingdom." □

Jung in the Balance

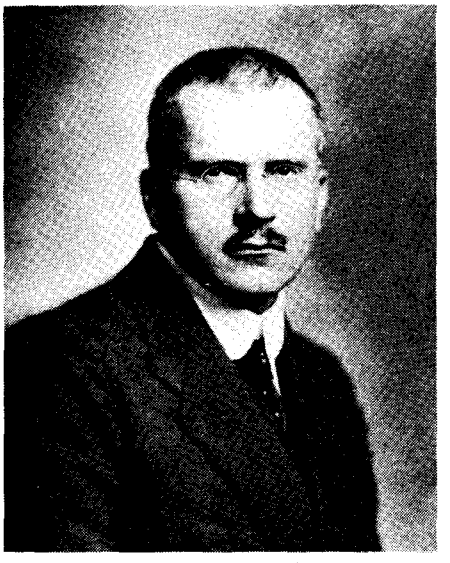
C. G. JUNG: LETTERS. Selected and edited by Gerhard Adler in collaboration with Aniela Jaffe. Illustrated. 596 pages. Princeton University Press. $17.50.

BY ROBERT SUSSMAN STEWART

Perhaps the most remarkable thing about Jung's career is that it ranged over so many decades and so many subjects, spanning nearly 100 years of medical psychiatry from the revolutionary libido theories of the late 19th century to the newer, radical therapies of today. Carl Gustav Jung began his work in the 1890s, in Zurich under Eugen Bleuler, treating schizophrenics by word-association tests of his own devising. Shortly afterwards he became the most influential of Freud's disciples (it was Jung, in fact, who coined the term Oedipus complex) and was picked by him to be the first president of the International Psychoanalytical Association. Later he broke with Freud and psychosexuality, creating his own analytical psychology out of archetypal Christian symbolism and the concept of a collective unconscious. In his later years (he died in 1960), his interest turned to the *I Ching*, to telepathy and the occult, and to the efficacy of both Yoga and Zen.

Yet such a widening of scope makes the full extent of his contribution difficult to measure. From 1914 onward, after Jung had severed his connection with Freud, his work was never again as systematic as it had been; and although he had had numerous patients and pupils, the so-called Jungian School never quite flourished in the same way that the "Freudian School" did—at least not in America, where the Freudians developed a whole network of psychoanalytic societies and training institutes. But more important, with each of the theoretical volumes (more than 30 of them) there came an interesting complexity, a greater degree of fragmentation, a constant shifting of gears, as though it mattered little whether or not it was the imagery of theology or alchemy, of Protestantism, of Gnosticism, of Taoism, or of Buddhism that gave substance to any particular symbolic form—so that by the end one sensed that he was at the point of almost unfathomable mysticism, where he saw what he called "the frontier of the human mind" moving closer and closer to "the portcullis of God." Which is not to say that this necessarily lessens the value of Jung's work, but rather to explain why it is that for many—this reviewer included —his exact place in the history of scientific psychology continues to hang in the balance.

It is good, then, to have this sizable, carefully edited first volume of Jung's collected letters; for if they do not give us needed clues to Jungian theory, they indeed help us to come to terms with the man himself. In letter after letter we see a sharp edge cutting through the obscurity: we see a Jung who had a deep, honest, and straightforward concern for his patients and for those who wrote to him about their problems. With a kind of simple man's dedication, and an admirable lack of pretentiousness, he reached out to them, comforted them in whatever way he could (although Jung never lost sight



C. G. Jung, 1912

Robert Sussman Stewart is a frequent contributor to SR *and is completing a history of psychoanalysis since the death of Freud.*

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of the importance of unconscious phenomena, his technique was essentially eclectic), so that when he writes, "As a doctor I am interested in only one thing: how can the wound be healed?" one believes him—or one should say one believes *in* him.

What is also striking in these letters is how fully aware Jung was that his work was attacked as being unscientific and how often, if not always, he parried the thrust, attempted to put his spiritual inclinations, his "temperamental empiricism" (his own term), into some kind of perspective. With a Wittgensteinian fervor, he more than once made conscious efforts to separate what was scientific from what was metaphysical in his work, as in an illuminating letter to Father Victor White, in which he writes: "You accuse me of repudiating the divine transcendence altogether. This is not quite correct. I merely omit it, since I am unable to prove it. I don't preach; I try to establish psychological facts. I can confirm and prove the interrelation of the God-image with other parts of the psyche, but I cannot go further without committing the error of metaphysical assertion, which is far beyond my scope."

There is only one section of letters that significantly detracts from the image of Jung as being humanly objective, and that is the section covering the period of the Nazi takeover of Germany. Although there is no need to assume he felt any overt hostility toward Jews, one does have some questions about his behavior at this time: why, for example, as president of the International Medical Society for Psychotherapy, did he go along with the *Gleichschaltung*, the "conforming" of the German members of this group, which really meant the removal of its non-Aryan members? Why, too, did he merely protest rather than resign from the presidency when his name was put on a Nazi manifesto for psychotherapy, apparently by mistake, by Professor M. H. Göring, the cousin of Hermann Göring, who was the leader of the society's German membership? It was Jung's contention that from neutral Switzerland he could save psychotherapy within Germany, but surely he must have been aware of how his support, even if minimal, would be used in such a treacherous political atmosphere as wholesale propaganda.

To these questions there are, alas, no answers, although perhaps there may be some in the near future, when both Jung's personal family letters and the full correspondence with Freud—which are sadly missing here—are to be published. Then even more light may be thrown on the strange shadows surrounding this unusually gifted and elusive figure. □

SR RECOMMENDS

General Books: *A rotating selection by the book review editors of ten particularly notable new and current books of general interest (fiction and nonfiction), arranged alphabetically by title.*

AFTER CONVICTION. By Ronald L. Goldfarb and Linda R. Singer (Simon & Schuster, $15.95)—A comprehensive review of the American correction system—why it doesn't work and how it might be made to work.

BIRD LIVES! The High Life and Hard Times of Charlie (Yardbird) Parker. By Ross Russell (Charterhouse, $8.95)—This full-scale biography of alto saxist Charlie Parker is not only a tribute to that musician but a portrait of black culture in the 1930s and 1940s and one of the best books ever written about jazz.

CATHOLICS. By Brian Moore (Holt, Rinehart & Winston, $4.95)—A brief, compelling novel about a confrontation in the ecumenical world of the future between a representative of the new religion and some isolated Irish monks who have kept to their old faith.

DEEPER INTO MOVIES. By Pauline Kael (Atlantic-Little, Brown, $12.95)—This huge new collection of movie reviews (1969-1972), by a critic whose writing combines intelligence, enthusiasm, wit, and clarity, serves also as a record of current interaction between movies—our national theater—and our national life.

FEAR AND LOATHING ON THE CAMPAIGN TRAIL '72. By Hunter S. Thompson (Straight Arrow, $6.95)—A wild, highly original excursion into the frontal lobes of the 1972 presidential campaign by the author of *Fear and Loathing in Las Vegas.*

GRAVITY'S RAINBOW. By Thomas Pynchon (Viking, $15; paperback, $4.95)—Hailed as a major literary event, this mammoth new novel—in size, complexity, and imaginative scope—is set toward the end of World War II and has to do in part with the firing off of a renegade V-2 rocket.

I'M SOMEBODY IMPORTANT: Young Black Voices From Rural Georgia. By George Mitchell (University of Illinois, $7.95)—Six children in one of the country's poorest regions talk, with extraordinary candor and eloquence, about their bewilderments, hopes, and hurts.

THE INSPECTOR. By Saul Steinberg (Viking, $10)—A new, very witty, sometimes lethal collection of drawings by the artist-cartoonist.

KEROUAC. By Ann Charters (Straight Arrow, $7.95)—A rich, sympathetic, and immensely readable biography of the late author of *On the Road,* whose own life on the road and those of his friends—Neal Cassady, Allen Ginsberg, William Burroughs, among others—supplied the raw material for his 18 books and gave impetus to the Beat movement.

WITTGENSTEIN'S VIENNA. By Allan Janik and Stephen Toulmin (Simon & Schuster, $8.95)—A cross-disciplinary cultural history of late Hapsburg Vienna from 1890 to 1919, focusing primarily on the life and work of Ludwig Wittgenstein and the intellectual milieu that helped to shape his philosophy; a challenging and rewarding book.

Science Books: *A selection by the editors of particularly notable recently published books, arranged alphabetically by title.*

BLOOD. By Earle Hackett (Saturday Review Press, $9.95)—Everything you weren't aware you wanted to know about hematology and hematosophy, told engagingly and in detail.

C. G. JUNG: LETTERS. Selected and edited by Gerhard Adler in collaboration with Aniela Jaffe (Princeton University, $17.50)—Although there are unavoidable gaps—family letters were not released, and the bulk of the Jung-Freud correspondence will be published separately—this first volume of an intended two includes 935 letters to friends, colleagues, and patients and provides important insights into the life and mind of the Swiss psychiatrist.

ENCOUNTER GROUPS: First Facts. By Morton A. Lieberman, Irvin D. Yalom, and Matthew B. Miles (Basic Books, $15)—A Stanford University research project-based study that casts a cautionary eye on the techniques and supposed benefits of encounter therapy.

GENETICS AND AMERICAN SOCIETY. By Kenneth M. Ludmerer (Johns Hopkins, $10)—An important, skillfully written history of the social impact of genetics, including its early distortion to influence restrictive legislation and promote racial prejudice.

INSECTS OF THE WORLD. By Walter Linsenmaier (McGraw-Hill, $25)—An entomological survey that is unique in its kind: sumptuously produced (160 full-color paintings and hundreds of drawings), scientifically precise, and written with poetic grace.

THE POLAR WORLDS. By Richard Perry (Taplinger, $7.95)—A charmingly written ecological and wildlife comparison of the Arctic and Antarctic, from penguins and polar bears to moss and lichen.

RETHINK: A Paraprimitive Solution. By Gordon Rattray Taylor (Dutton, $7.95)—A survey of the social attitudes—wrong-think, non-think, and double-think—that make up our technological society, with some intriguing recommendations for improving its quality, by the author of *The Biological Time Bomb.*

THE SERENGETI LION: A Study of Predator-Prey Relations. By George B. Schaller (University of Chicago, $12.50)—A major scientific study of the life and behavior of the East African lion and its predator-rivals and prey by a leading zoologist and author of *The Year of the Gorilla* and other books.

TURTLES OF THE UNITED STATES. By Carl H. Ernst and Roger W. Barbour (University of Kentucky, $22.50)—A comprehensive discussion, generously illustrated with both black-and-white and color photographs, of the lives, growth patterns, habitats, etc., of the 49 indigenous species of turtles, tortoises, and terrapins in the United States; a fascinating book that strikes an excellent balance between the scientific and the popular.

WALKING THE DEAD DIAMOND RIVER. By Edward Hoagland (Random House, $7.95)—The New England wilderness of grouse, coyotes, deer, and the Manhattan urban scene of go-go girls, boxing, the circus, juxtaposed in a splendid collection of 19 personal essays by one of the finest writers in the genre.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

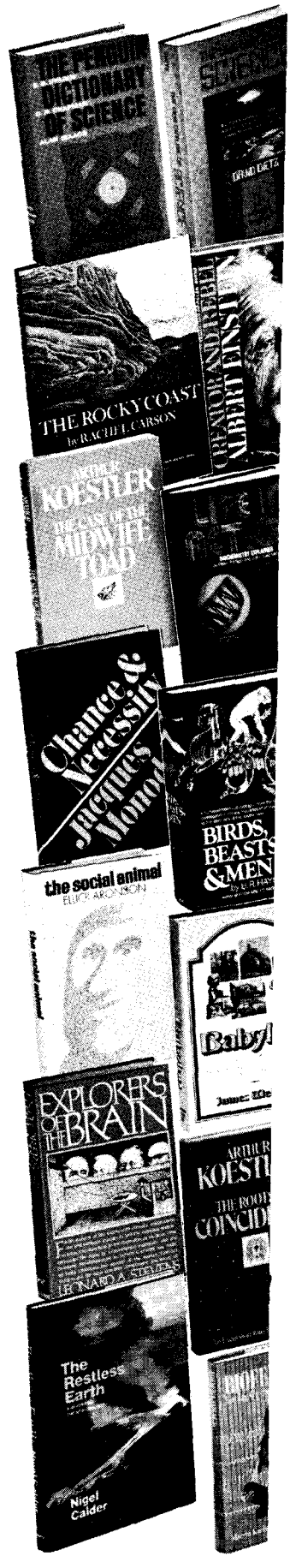
if you have an intelligent interest in scientific discovery and are aware how intimately science touches our lives...

and you know how important it is for citizens not to abdicate decision-making powers to specialists and technocrats...

but you have been put off repeatedly by the writing too often found in science books today—pedantic, jargon-ridden and dull...

then you are precisely the kind of person for whom we have now created the

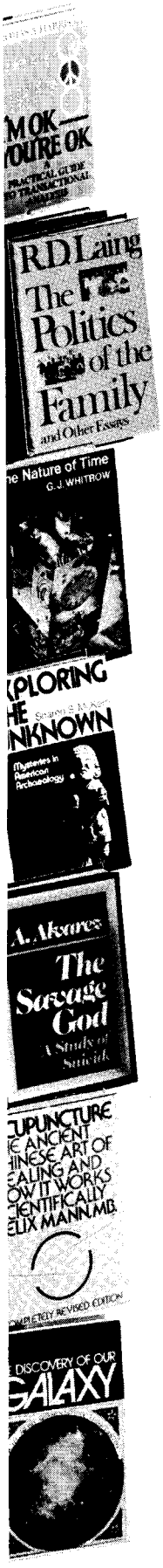
Saturday Review Science Book Club



UNTIL NOW there has been no book club designed expressly for informed people who are serious readers, who have an intelligent awareness of science, and who are interested only in *real* science writing...by which we mean writing that is neither overspecialized, technical gobbledygook on the one hand, nor superficial, watered-down popularization on the other.

Today at last, with the creation of the new Saturday Review Science Book Club, the gap is filled. As a member of the Saturday Review Science Book Club, you will be offered the latest, the most important and enduring, the most truly *literate* books published in science. Their range will be broad, their level will be stimulating, their contents will be undiluted yet always readable and provocative. And Member's Prices will save you an average of 20% (often more) on the books you decide to take. The 27 selections described on the adjoining page are typical of the books you can regularly expect to find as offerings of the Saturday Review Science Book Club. Why not sign up right now?

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



Your Charter Membership Invitation from the new

Saturday Review Science Book Club

Join Now and Choose

Any 4 *of these 27 important and enjoyable books in science* For $1

008. The New Outline of Science *By David Dietz.* A dazzling panorama.
Publisher's price $17.50

042. Discovery of Our Galaxy *By Chas. A. Whitney.* The great astronomers' lives and achievements.
Publisher's price $10.00

612. The Restless Earth *By Nigel Calder.* Report on the new geology.
Publisher's price $10.00

295. Penguin Dictionary of Science *Uvarov, Chapman & Isaacs, eds.* Enlarged 4th edition, 5000 entries.
Publisher's price $11.95

516. Biofeedback *By Karlins & Andrews.* Can bodily processes be controlled by the power of mind?
Publisher's price $5.95

030. Albert Einstein: Creator and Rebel *By Banesh Hoffmann.* His work and thought.
Publisher's price $8.95

105. Explorers of the Brain *By Leonard A. Stevens.* Up-to-date findings.
Publisher's price $7.95

317. Roots of Coincidence *By Arthur Koestler.* Extra-sensory perception: a critique-probe.
Publisher's price $5.95

378. People's Handbook of Medical Care *By Arthur & Stuart Frank.* Anti-establishment health guide.
Publisher's price $8.95

337. I'm OK—You're OK *By Thomas A. Harris.* Definitive introduction to Transactional Analysis.
Publisher's price $5.95

299. Exploring the Unknown *By Sharon S. McKern.* Incas, Aztecs and Mayas: the lost civilizations.
Publisher's price $5.95

494. Body Time *By Gay Gaer Luce.* Physiological rhythms and social stress: a groundbreaking view.
Publisher's price $6.95

559. The Savage God *By A. Alvarez.* Suicide and creativity: related?
Publisher's price $7.95

052. The Social Animal *By Elliot Aronson.* Intro to social psychology.
Publisher's price $7.95

573. Birds, Beasts and Men *By H. R. Hays.* Zoology, from its beginnings.
Publisher's price $8.95

351. Babylon *By James Wellard.* The fabled metropolis reconstructed.
Publisher's price $7.95

260. Mathematics Made Difficult *By Carl E. Linderholm.* This witty guide does precisely the opposite!
Publisher's price $6.95

143. The Rocky Coast *By Rachel Carson.* Her greatest writings in lavish, illustrated edition.
Publisher's price $6.95

387. Knots/Politics of the Family *By R. D. Laing.* His two influential books. Combined publ. price $10.90

594. In Critical Condition *By Sen. Edward M. Kennedy.* A slashing attack on the status of U.S. health care.
Publisher's price $6.95

465. Computers and You *By Kurt Stehling.* Social applications of data processing science.
Publisher's price $8.95

496. Case of the Midwife Toad *By Arthur Koestler.* Is the theory of evolution *really* accurate?
Publisher's price $5.95

147. Life in Action *By Farago & Lagnado.* Biochemistry today.
Publisher's price $6.95

482. Acupuncture *By Felix Mann.* All about the Chinese healing method.
Publisher's price $6.95

095. The Nature of Time *By G. J. Whitrow.* Does time have objectivity, an end, progression—or what?
Publisher's price $6.95

093. Humanly Possible *By Jean Rostand.* The shape of mankind's future.
Publisher's price $6.95

417. Chance and Necessity *By Jacques Monod.* An a-causal universe?
Publisher's price $6.95

YOURS FOR $1 — BOOKS VALUED UP TO $54.40

Saturday Review Science Book Club 3-KO4317
Huntingdon Valley, Pennsylvania 19006

Please accept my application for membership and send me the four books whose numbers I have printed in the boxes below. Bill me only $1 plus shipping and handling for all four.

If I am not delighted with these books, I may return them within 10 days. My membership will be canceled and I will owe nothing. If I keep them, about every four weeks I will receive the Club's free newsletter describing the forthcoming selection, plus dozens of alternates. If I wish to receive the selection, I need do nothing; it will be shipped to me automatically. If I prefer an alternate, or no book at all, I will notify you by the date specified on the convenient reply form always provided. I need purchase only four books during the coming year, at savings averaging 20% off publishers' prices. I may cancel my membership any time after these purchases. A modest shipping and handling charge is added to all shipments.

Mr.
Mrs. _____
Miss PLEASE PRINT
Address _____

City _____ **State & Zip** _____

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The Eugenics File

GENETICS AND AMERICAN SOCIETY: A Historical Appraisal. By Kenneth M. Ludmerer. 222 pages. Johns Hopkins University Press. $10.

BY BRUCE WALLACE

As a sophomore at Columbia College, I took an undergraduate genetics course under Professor L. C. Dunn. The following year I enrolled in an education course at Columbia Teachers College. During that year I was called upon to give a brief lecture on genetics to the class. In the subsequent half hour I incurred the ill-concealed displeasure of the instructor by repeatedly denying that my remarks supported her simplistic discussion of certain families and races. Never again have I been compelled to voice as many that-is-not-necessarily-so's in a single hour as I did that day in 1939. Kenneth Ludmerer's *Genetics and American Society* is, to a large extent, an account of the uncritical use to which genetics was put by persons seeking to bolster racial and social prejudices. It is a fascinating account, skillfully done.

Conservative and propertied Americans (predominantly of north European origin) at the close of the 19th century looked with increasing dismay upon a number of displays of social unrest. They were particularly alarmed at the influx of newcomers from southern and eastern Europe. Their fears provided an environment within which the American eugenics movement, aimed at "uprooting" hereditary characteristics by controlling reproduction, flourished. Indeed, the early eugenists themselves were largely drawn from the conservative upper and middle classes of American society. Starting with this biased background, Ludmerer traces the growth of the American eugenics movement, its association with early geneticists, the developing alienation of the geneticists, and finally their revolt against eugenics programs.

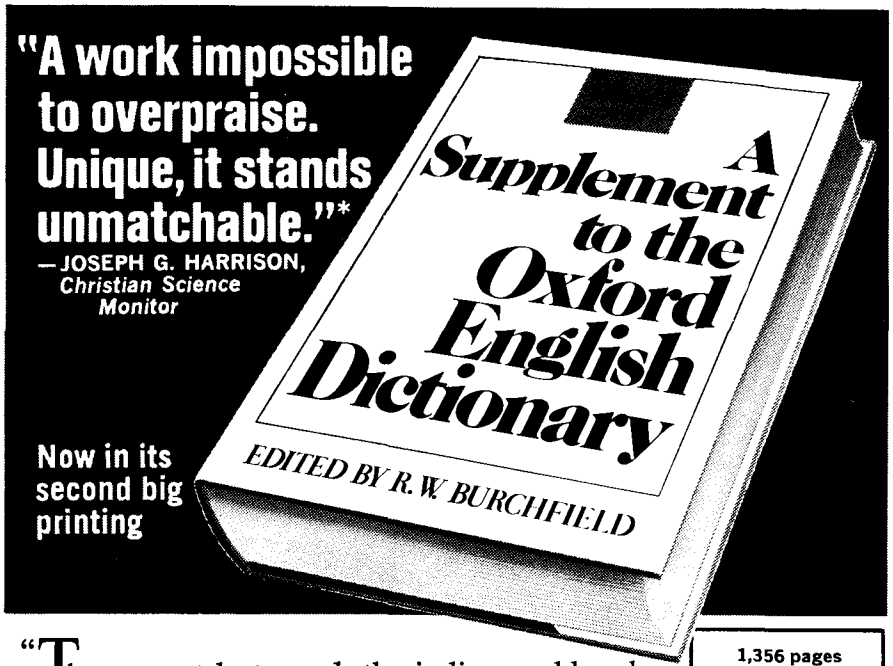
At the outset the elementary concepts of Mendelian genetics encouraged the notion that man, not unlike the agricultural plants and animals he controlled, might benefit from controlled breeding programs. An early eugenic aim was the elimination from human populations of seemingly simple, unwanted hereditary disorders. Quickly, however, the movement spread to encompass not only the promotion of sterilization laws but also the restricted immigration of unwanted races and nationalities—groups that *by definition* possessed unwanted hereditary material.

During the early 1900s human genetics consisted of little more than the systematic accumulation of family histories or, as they are known technically, pedigrees. (Archibald Garrod's work on the inborn errors of metabolism, like Mendel's work of earlier decades, lay unrecognized.) Even the accumulation of pedigrees, though, can be carried out in a respectable manner. Because of their biases, however, the early American eugenist–human geneticists proceeded to gather data incorrectly. Laymen were urged to collect and submit pedigrees to research institutes. "[The] field worker must understand," wrote Charles B. Davenport, one of the leading geneticists of the day, "that each parent [of a feeble-minded child] will probably have somewhere in his or her ancestry a feeble-minded person, and it is the business of the field worker to make a special search for such person or persons in the pedigree." Unless they are carried out with exceptional zeal, "special searches" generate biased data. This is so because, for example, the family lineage of any person undoubtedly includes feeble-minded ancestors.

The eugenists had powerful political allies. Although geneticists in increasing numbers spoke out against the slipshod research being done in the name of eugenics, the eugenists successfully sponsored sterilization laws in some 30 states. The Immigration Restriction Act of 1924 (which remained in effect until 1965) was passed largely because of supporting testimony provided by the staff of the Eugenics Record Office in Long Island. Finally (and this completed the alienation of wavering geneticists), the eugenists praised the race-hygiene program of Hitler's Germany.

The American eugenics movement very nearly stifled the scientific study of human genetics in the United States. Indeed, human genetics was saved largely by such British scientists as J. B. S. Haldane, R. A. Fisher, and Lancelot Hogben; these were geneticists who understood the mathematics that were necessary for summarizing and comprehending even carefully collected pedigrees. Modern human genetics rests largely on the early work of these men; its current explosion, however, can be ascribed to 1) concern over the dysgenic effects of mutagenic ("atomic") radiation, 2) contributions of young molecular geneticists, and 3)

Bruce Wallace, a professor of genetics at Cornell University, is the author of Essays in Social Biology.


"A work impossible to overpraise. Unique, it stands unmatchable."*
—JOSEPH G. HARRISON, Christian Science Monitor
A Supplement to the Oxford English Dictionary
EDITED BY R. W. BURCHFIELD
Now in its second big printing

"The present last word, the indispensable addendum to what is, in all probability, the greatest continuing work of scholarship that this century has produced."
—PETER S. PRESCOTT, *Newsweek*

OXFORD UNIVERSITY PRESS
200 Madison Avenue, New York, N.Y. 10016

1,356 pages
18,000 main words
30,000 meanings
130,000 illustrative quotations
SIZE: 9⅜ x 12″
$50

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the development of sophisticated cytological techniques.

The relationship of geneticists to American society is an early example of what Ludmerer calls "biological sociology." This relationship has a special interest because of the current involvement of ecologists and environmentalists in societal affairs. As a historian, Ludmerer manages to convey an impression of slight disdain for the early intrusions of biologists into the affairs of social scientists.

Does the present concern of biologists over population growth, resource depletion, and environmental degradation promise to fare better than that exhibited by early geneticists? I believe so, provided that today's biologists clearly separate their personal preferences from recommendations concerning the maintenance of the earth in perpetuity. The error of biological sociologists of the past, as Ludmerer makes clear, was to regard human society as an organism and to recommend as *good* those processes and phenomena that occur in nature—good, that is, *because* they occur in nature.

Biochemists and biophysicists make no effort to reform chemistry or physics; on the contrary, they are satisfied to identify the constraints within which chemical and physical phenomena must occur if they are integral parts of living systems. Similarly, biosociologists, if they are to have a place of respect in both science and society, must learn to identify (and teach others how to identify) the constraints within which societal affairs are to be conducted if life is to continue on earth. Merely to parade the intricacies of biology before nonbiologists in order to awe and thereby gain a measure of power would clearly repeat the errors of the past. □

Answer to **Wit Twister**, Page 3: sired, rides, Dries.

Answer to **Literary Crypt**, Page 3: *I know no method to secure the repeal of bad or obnoxious laws so effective as their stringent execution.*

U. S. Grant

SOLUTION OF THIS ISSUE'S KINGSLEY DOUBLE-CROSTIC (No. 2036)

MALCOLM S. FORBES:
SACRED COW

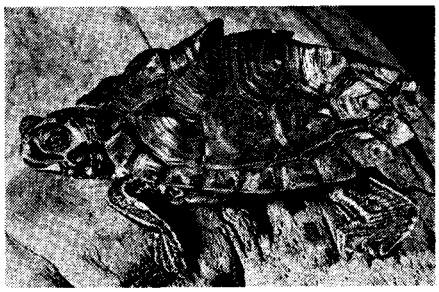
Ford's Henry Ford made news recently when he urged that some of the multi-billion dollar annual highway trust funds be used for mass-transit research and development. To have anyone in the Automotive Establishment make sense about that Sacred Cow, the high-way trust fund, is momentous.

Hard Shell, Soft Shell

TURTLES OF THE UNITED STATES. By Carl H. Ernst and Roger W. Barbour. Illustrated. 347 pages. The University Press of Kentucky. $22.50.

The knowledge explosion has reached the turtle. Since 1952, the authors of this handsomely produced book tell us, "the knowledge of the biology of our turtles has more than doubled. Meanwhile, too, many more people—research scientists, public-health workers, naturalists, teachers, hobbyists—have become interested in turtles." Hence a new book, intended to be both scientific and popular, on the 49 indigenous species of turtles in the United States. By "turtle," the authors also mean tortoises and terrapins, so the book in fact includes more than the title might at first suggest.

Like all good reference books, *Turtles of the United States* is fun to browse through. The organization is simple; the presentation seems thorough; the balance intended by the authors between "scientific" and "popular" is well handled. Lay readers may find the physical description of each species somewhat technical; the descriptions of habitat, behavior, reproduction, and growth are clear and interesting.



Barbour's map turtle, from Turtles of the United States

The book is copiously illustrated with both black-and-white and color photographs, and the turtles are a wonder to behold. *Macroclemys temminckii* (the alligator snapping turtle) looks like something out of one of Maurice Sendak's children's books, and *Trionyx spiniferus spiniferus* (midland smooth softshell) as though it had just flown in from another galaxy. There is also an informative chapter about the "Care of Turtles in Captivity" that turtle owners of all ages should find helpful.

A.H.

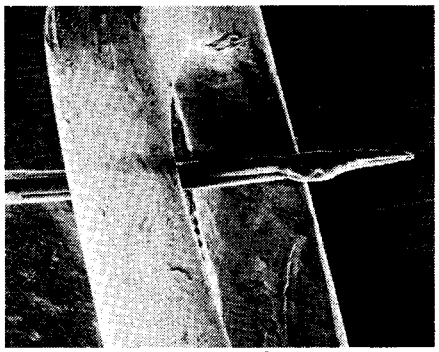
A New View

THE SCANNING ELECTRON MICROSCOPE: World of the Infinitely Small. By C. P. Gilmore. Illustrated. 159 pages. New York Graphic. $15.95.

Magnified in a microscope, ragweed pollen looks menacing, as if it could cause a thousand extra sneezes; by comparison—in nature function often seems to follow form—lily pollen is lovely and delicately patterned. Scientists have been looking at pollen under microscopes for years, but not until the availability (in the late 1960s) of the scanning electron microscope—a massive, complex instrument costing $100,000, which puts it out of the reach of your average chemistry set—has it been possible to see so much intricate detail in microscopic objects. Both the conventional electron and light microscopes are transmission instruments and produce an X-ray-like view, whereas the scanning electron, by photographing the *surface* of an object—exactly as a regular camera—produces pictures of amazing three-dimensional clarity.

In 175 black-and-white photographs *The Scanning Electron Microscope* shows some of the ways in which the instrument is used for research. There are extraordinary close-ups of disease-causing bacteria, before and after exposure to antibiotics; others of healthy red blood cells and the disfigured shapes of those affected by sickle-cell anemia. Moon dust magnified 7,000 times proves to be made up of huge numbers of tiny spheres rather like ball bearings (no wonder the Apollo 11 astronauts complained that walking on the moon was slippery). The taste buds of rats, vampire bats, and humans (which may be as distinctive as fingerprints) look entirely unappetizing.

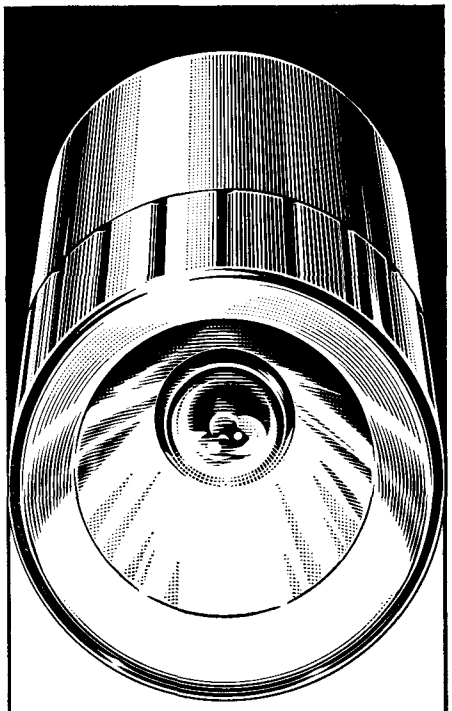
And because industry seldom lags far behind science, it's not surprising to find photographs of commercial subjects here as well: we're shown what broken elastic girdle fibers look like, given a comparison between a new and used razor blade, and, from a shaving product manufacturer, educated about the condition of a whisker six hours after a shave.



Bee's stinger through the eye of a needle, magnified 45 times, from The Scanning Electron Microscope

G.S.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



the flashlight that will stay fresh for at least five years

Trouble with flashlights is they usually don't work when you need them. They may lie around in your drawer, in your glove compartment, or on your shelf until the fuse blows, the power fails, you have to change a tire at night or look for a cufflink under the bed. And when that happens you'll find, more often than not, that the batteries have leaked and have corroded everything. This cannot occur with 5-YEAR FLASHLIGHT. It has a minimum guaranteed shelf life of five years (we replace free if it fails) and comes with a cunning rotary switch especially designed for use in NASA space missions. So if you think you should have a power cell flashlight that will stay fresh for five years or more, and that will give a minimum of ten to twenty hours of brilliant light, order the 5-YEAR FLASHLIGHT today.

☐ Please send me _____ 5-YEAR FLASHLIGHTS at $6.95 each. I may return the flashlights for full refund within two weeks if not delighted. My check, plus one dollar for postage and insurance, (California deliveries add tax) is enclosed. B/A or MC cards welcome. Please give number and expiration date.

Name_____

Address_____

_____ Zip_____

haverhill's

584 Washington, San Francisco 94111

356

SHORTER REVIEWS

WALKING THE DEAD DIAMOND RIVER. By Edward Hoagland. 340 pages. Random House. $7.95.

This collection of personal essays by Edward Hoagland, who is also a novelist (*The Circle Home*) and sometimes a journalist, is everything one hopes for—but rarely comes across—in this very special form: perfectly written, intelligent, civilized, and entertaining. Because Hoagland lives for part of the year in Manhattan, several of the 19 pieces in *Walking the Dead Diamond River* have to do with an urban scene of lunchtime go-go girls, his West Village neighborhood, boxing, the circus. During the months Hoagland is "summer folk" in northern New England, he is, in a curious sense, just as appealingly streetwise and pragmatic, as he writes about hiking through virtually inaccessible wilderness, seeks out old-timers, picks the brains of forestry people, accompanies a biologist on a grouse count, and puts in a good word for coyotes. Hoagland condemns blood sports—yet he keeps his 100 acres in Vermont unposted. He can't, he's decided, sensibly oppose deer hunting (though it's not his sport) when approximately 20 deer per square mile starve to death each winter in the state. Hoagland convinces about conservation, in part because he's never preachy or sanctimonious. His writing about the wilderness—its isolation, joys, and discovery—is comparable to Thoreau's; a splendid book.

COOLEY: The Career of a Great Heart Surgeon. By Harry Minetree. 298 pages. Harper's Magazine Press. $8.95.

The uproar over heart transplants hadn't quieted when, in the spring of 1969, things really hotted up after a Houston cardiovascular surgeon named Denton Cooley implanted an artificial heart to keep his patient alive during the frantic 64 hours it took to find a natural heart donor. (The patient later died of other complications.) Unquestionably it was a remarkable achievement; but, for many, the use of the mechanical device seemed to be going too far too soon, and Cooley was censured by his county medical society and the American College of Surgeons. The event is at the center of *Cooley*, a biography that remains sympathetic without turning into an apologia. Harry Minetree takes the realistic stance that miracle makers needn't be saints; and although he focuses on the numerous surgical innovations that have taken Cooley to the top of the profession, he also doesn't whitewash those qualities that make Cooley controversial: an ego as big as his skill, a not-so-subtle drive to head the pack, a circle of friends that includes more jet setters and crowned heads than medical colleagues, and the enormous amount of money he's earned. Already a *wunderkind* by the time he graduated from Johns Hopkins in 1944, Cooley seems always to have had that unbeatable combination of talent and luck that brought him under the wing of prominent heart specialists during his internship, his training at London's Brompton Chest Hospital, and, finally, in 1951, when he joined Dr. Michael DeBakey's staff at Baylor Medical College. The notorious rivalry between the two doctors to be "first" in heart surgery and the in-fighting among their staff does nobody proud; Minetree tends toward Cooley's camp—not too surprising, since the surgeon once saved his life against heavy odds. Although a reader is left wondering what all the duplication of time and energy in such bitter competition must have cost, reading about medicine's best and brightest is nevertheless positively irresistible here.

THE MANIPULATOR: A Psychoanalytic View. By Ben Bursten, M.D. 277 pages Yale University Press. $10.

A psychiatric patient who purposely disrupts a ward and divides the staff to gain his own ends is obviously behaving manipulatively. But is a psychiatrist also being manipulative, say, when he phonies an abortion recommendation to undermine a law he considers unfair? Ben Bursten, himself a psychiatrist, thinks so in an intriguing pioneering study called *The Manipulator*—which analyzes a behavior disorder that psychiatrists seem to talk a lot about but, curiously, haven't much researched as a separate behavior pattern per se. Diagnosis is extremely difficult, Dr. Bursten stresses, and there are questions he hasn't answers for. Nevertheless, he takes a deep breath and a humanistic, nonjudgmental viewpoint and goes on to define the four interrelated components he feels comprise the "manipulative personality": a conflict of goals—something that a manipulator wants but that another person won't comply with; the manipulator's conscious intention to influence by manipulation; the presence of deception and insincerity, an element of fraud; and a sense of satisfaction, exhilaration really, at having pulled a fast one. The manipulative personality is seen as a type of narcissistic personality, yet generally with a sufficient self-object differentiation to be able to maintain ego boundaries, as well as a value system in which truth is subordinated to image building. Dr. Bursten has opened a veritable Pandora's box, in which, of course, there is to be found a bit of each of us. ☐

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

MUSIC

Finding the Lost Chord; Graffman; Gibbs

BY IRVING KOLODIN

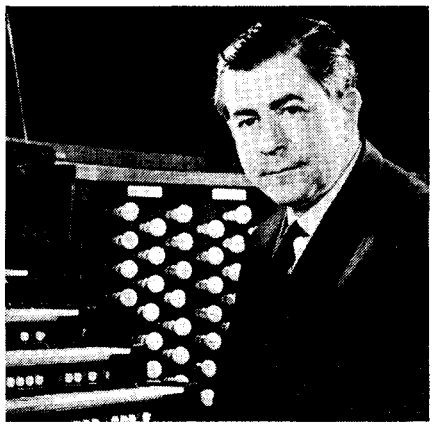
A rare order of informality pervaded the evening in Philharmonic Hall that brought Pierre Cochereau of Paris to the console of its Aeolian-Skinner organ. In addition to all the other attainments that qualify him to be organist of the Cathedral of Notre Dame, Cochereau is an exponent of the art of improvisation.

That is to say, he is one of the few learned musicians of the day who keep faith with a tradition that has passed largely into jazz. Armed only with his own skills, Cochereau demonstrated that improvisation can be done and done well, even with materials of which he had no preknowledge.

Seated with his back to the audience, the better to display his footwork on the pedals as well as his fingering of the manuals, Cochereau was a living embodiment of the organist immortalized in Adelaide Procter's text and Arthur Sullivan's music. He found not only some lost chords but a good many others for which he was artfully searching as he evolved preludes, fugues, variations, and other complicated structures.

Traditionally, themes for improvisation are submitted in the form of intervals with no prior identity. Cochereau accepted the additional challenge of dealing with familiar themes—the better to demonstrate his capacity for transforming them. For the first Prelude and Fugue, he was assigned a fanfare by Jean Mouret, which is associated with a radio program of Ralph Lowenstein, the emcee of the occasion. This afforded barely more than a finger-loosening exercise for Cochereau, whose mastery of contrapuntal combinations, color, and contrast was neatly equal to the task.

When he retired offstage, the choices for the "Symphonic triptyque" were announced to the audience. These were, for rhythmic detail, the March from Prokofiev's *Love for Three Oranges* and, for melodic contrast, the swelling climax of Sibelius's *Finlandia*. Upon resuming his seat on the organ bench and scrutinizing the thematic skeletons set out on the music rack, Cochereau responded with one of the most elo-



Cochereau in Philharmonic Hall

quent of French shrugs. It said, all too clearly, "What can one do with a perversely chromatic march theme and a decidedly diatonic chorale?"

He then proceeded to do the undoable, by filtering out some of the chromatics in Prokofiev and spicing up the plainer harmonies of Sibelius. This did not come about for some time, as he worked first with one theme and then with the other. Through the application of much aptitude, considerable schooling, and even more ingenuity, he evolved an outcome that was organically—in more than the instrumental sense—unified.

In the succeeding sections of the program, Cochereau undertook to make a blend of materials by Dvorák and Wagner in an "Informal Symphony," also a Chorale and Variations from a "Popular Theme" (as popular as "Jesus Christ Superstar"). The results were both diverting and stimulating, wholly supportive of his reputation as a master craftsman. The next time around, Cochereau should be given matter of less specific association, to promote creativity as well as virtuosity.

Twenty-five years ago Gary Graffman earned a debut in Carnegie Hall by winning second place in a much advertised competition organized to honor the great Sergei Rachmaninoff. He was then a pianist of prodigious promise. At his recent silver anniversary recital in the same hall, Graffman showed that he has applied the intervening years to establish his high rank in a category beyond the qualification of "American." There can be no question of his greatness as a pianist. Graffman has the power, precision, clarity, dynamic range, and wash of tone color available only to the elite. But he is, even now, far from an unfailingly satisfying interpreter. There were moments in both the Opus 13 (*Pathétique*) sonata of Beethoven and the Handel Variations of Brahms that were uniquely fulfilling of the composer's purpose. Both were preceded or followed by instances of exaggeration difficult to associate with the same performer.

The emerging pattern showed Graffman at his best in the flowing Adagio of the Beethoven sonata and the lyric episodes of the Brahms variations. These were restricted, contained, and superbly controlled. When he had the latitude to unleash his full power, it tended to run amok, take over, go for broke. Thus, witchery in Variation No. 13 of the Brahms (*largamente* is the marking) gave way to butchery of No. 14 (in a faster tempo). He had more malleable material for purely pianistic purposes later on in Ravel's *Gaspard de la nuit* and Balakirev's *Islamey*.

As an incidental detail, it should be mentioned that the pianist who was chosen over Graffman in that famous competition of 1948 and won the riches of a recording contract, a national tour, etc., was Seymour Lipkin. He has since given up serious piano playing and has become a conductor—with far from notable results.

When Raymond Gibbs of Tucson, Arizona, made his Metropolitan Opera debut in 1970, it was as a high baritone, singing the part of Larkin in a revival of Puccini's *La Fanciulla del West*. As recently as the opening performance of the present season, he was cast as Morales (another baritone part) in the new production of Bizet's *Carmen*.

All the while, however, he has been working on a vocal transition, which culminated in a "second" debut in early April as a lyric tenor in the leading male role of Gounod's *Roméo et Juliette*. Gibbs is now unquestionably a tenor, and very lyric. He is good-looking, bears himself well, and is secure through the range of the role up to a B-flat. He gave voice to a fluent, well-focused version of "Ah! lève-toi, soleil." This is the showpiece of the part, and it evoked a real burst of applause.

On the debit side, Gibbs has yet to develop the assertiveness that goes with the performer of leading roles, and he let Colette Bokey, the evening's Juliette, outsing him in their duet. Gibbs has begun his new career from what might be called a standing start, but he has the qualities to go the distance. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

FILM

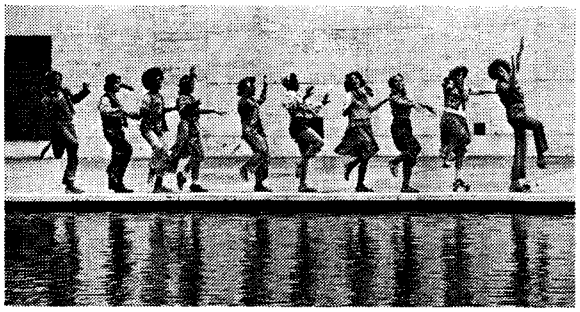
"Godspell": Dancing in the Streets

BY ARTHUR KNIGHT

There are few things I can think of that are more exhilarating than a really good movie, and few more thoroughly depressing than a really bad one. Part of the depression, I suppose, comes from the realization of how much hope, time, energy, and money goes into the making of any film, good or bad. There is a saying, popular in Hollywood, that nobody starts out deliberately to make a bad picture, and this is probably true. But filmmaking, like any communal enterprise, inevitably involves a certain amount of personality clashes; and in Hollywood, where status is equated with the power one is able to wield, compromise and capitulation is almost the name of the game. A picture may go into production with everyone in enthusiastic accord on script, casting, and point of view; but as the shooting progresses and the images appear on celluloid instead of in the mind's eye, differences of opinion begin to emerge. Then the filmmaking process is turned into a power play, and the picture itself is the ultimate victim. With this kind of tug-of-war going on behind the scenes of nearly every studio-made film, it is little short of a miracle that any survive at all.

One of those miracles has just been effected by Columbia Pictures, however, and I found it an occasion for dancing in the streets—in part, perhaps, because so much of *Godspell* actually does consist of dancing in the streets. And in the streets of Manhattan, at that! New York might seem to be the last place in the world to serve as a backdrop for the Gospel according to St. Matthew, and a clown show the least appropriate device for a retelling of the Jesus story. But somehow, as set to Stephen Schwartz's joyous rock score, it projects all of the innocent faith and fervor of early Christianity as the parables and rituals are re-created in modern terms and then becomes increasingly moving as the Passion approaches its inevitable climax. *Godspell,* with no religious trappings whatsoever, provides a religious experience of extraordinary intensity.

It begins, familiarly enough, with ordinary street shots of Manhattan—the early morning traffic jams, the turmoil of the garment center, a model answering an agency's "cattle call," a dancer glimpsed through the windows of a rehearsal hall. Before all of them, a quiet stranger appears, peaceful amidst the din and holding out the promise of greater peace. They follow him to the fountains in Central Park, where, in the guise of childlike play, a baptism is performed, climaxed by the baptism of the stranger himself by a youthful, radiant Jesus (Victor Garber). Stylistically, the transformation of ordinary young people into a motley group of the faithful creates a momentary problem. But so skillfully has director David Greene transformed Manhattan as well, eliminating completely its traffic and its street crowds, that in no time at all it becomes their private world, with an untrammeled beauty that few New Yorkers will recognize. It is as if he shot his entire picture very early on Sunday mornings in October, when New York is not only empty but sparkling.



Never, not even in Mayor Lindsay's fondest dreams, has Fun City looked more entrancing. The cameras swoop and glide among the skyscrapers, discover patches of green on rooftops and beneath the towering arches of New York's bridges, zoom from a glistening spire to a solitary singer performing on a roof blocks away and floors below. The Mall in Central Park provides the setting for a soft-shoe routine. The poster boards at Lincoln Center are mobilized in a kind of Mack Sennett flash-disappearance act for the "mote in thine own eye" parable, delivered as a vaudeville patter number. The inventiveness of the camera work continually transforms the drably familiar city into something fresh and wonderful, simply by looking at it in new ways.

Similarly, the inventiveness of the action itself, much of it mime, provides a seemingly inexhaustible supply of visual surprises. These may, on occasion, become a bit arch, but the youthful cast of ten is so exuberant, likable, and downright talented that one readily forgives them for their trespasses. Particularly since they play the Last Supper and the final Agony with such conviction and sincerity, one forgets for the moment the implicit trickery of setting these scenes in a deserted junkyard, with Jesus crucified on a chain-link fence. What really matter are the sober moments after the Crucifixion, when the small band of the faithful quietly remove their mummers' costumes and walk toward the dawn brightening over a deserted Park Avenue. They turn the corner and disappear from view. After a pause, however, the camera follows them and—in as perfect a cinematic metaphor as I have ever seen—reveals that they have in fact melted into the crowd, carrying their new faith with them, sharing it with all. It is a moment of unalloyed joy, of exultation, and of movie-made beauty. It is the perfect finale to a film that, for all its ingenuity, never places sheer virtuosity ahead of its religious conviction. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

NUMBERS, PLEASE!

ATTACH LABEL HERE

The numbers and letters on the label that brings Saturday Review your way each week may not mean much to you at first glance. But they are essential in helping our Subscription Department quickly identify your records. That is why it is important to include your address label whenever you write Saturday Review about your subscription.

CHANGE OF ADDRESS

Please let us know *at least four weeks before you plan to move.* For fastest service, clip or paste your current mailing address in space provided, fill in your name and address, and mail to Saturday Review's Subscriber Service Division.

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

Saturday Review
SUBSCRIBER SERVICE DIVISION
Box 2043, Rock Island, Illinois 61207

Mailbag Note

Please address comments about articles that have appeared in *Saturday Review* to: Letters to the Editor. Inquiries should be sent to: Reader Services. Article suggestions and manuscripts should be sent to our Contributors Department. The address for all of the above is 450 Pacific Avenue, San Francisco, California 94133. Poetry should be sent to our Contributors Department at 380 Madison Ave., N.Y., N.Y. 10017. Manuscripts, poetry, and cartoons will not be returned unless accompanied by a stamped, self-addressed envelope.

Learn how to guard against heart attack

Ask your Heart Association for vital information on the early warning signs of heart attack and what you should do to reduce your risk.

You can also learn more about high blood pressure, stroke, inborn heart defects and other heart and blood vessel diseases in interesting booklets prepared by medical experts. They are free — an educational service made possible by your gifts to the Heart Fund.

GIVE...so more will live HEART FUND

Contributed by the Publisher

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

CLASSIFIED

CLASSIFIED ADVERTISEMENTS must be consonant with the character of Saturday Review. The publisher reserves the right to accept or reject advertisements at his discretion. Rates for a single insertion, $1.60 per word, 10-word minimum. Box Numbers and Phone Numbers count as two words each. Rates for multiple insertions: 48 times in a contract year $1.40 per word each insertion; 24 times $1.45 per word each insertion; 12 times $1.50 per word each insertion; 6 times $1.55 per word each insertion. Full payment must be received nineteen days before publication. We forward all mail received in answer to box numbers. Mail to be called for at this office will be held 30 days only. Address Classified Department, Saturday Review, 380 Madison Avenue, New York, New York 10017. Tel. 212-883-8040.

LITERARY SERVICES

Reports, Manuscripts, academic writing, editing. All subjects. Reasonable. Personalized. Confidential. Professional team! RC Research, Box 138, Dayton, Washington 99328.

Words! Words! Words! Speeches, articles, novels. Robert Hogrogian, 201-489-0637.

BOOKS

America's Largest Catholic-Ecumenical publisher offers free PAULIST PUBLICATIONS tabloid. Write Paulist Press, 400 Sette Drive, Paramus, N.J. 07652.

Giant Free Catalogue. Nearly 4,000 unusual bargains. War surplus! Lenses, projectors, shutters, filters, viewers, lamps, magnifiers, accessories, booklets, kits. Many hard-to-get items. Request Catalogue CR, Edmund Scientific Company, 300 Edscorp Building, Barrington, New Jersey 08007.

Nature Books. Free 64 pp. illustrated catalogue. Box 83-N, Irvington, N.Y. 10533.

Publishers' Overstocks catalogue, free. Write Bookseller, Box 540, Sherman, Connecticut 06784.

Good Used Books—Wide variety, Intelligent selection. Libraries buy regularly; you can too! History, fiction, social sciences, literature, miscellaneous subjects. Send dollar for listing of 20,000 titles and prices. Editions, Desk SR, Boiceville, N.Y. 12412.

Save To 84% on publishers' overstocks. Free catalogue. Readers' Service, 1060 Twin Silo Lane, Huntingdon Valley, Pennsylvania 19006.

Out-Of-Print Books Supplied. Kendall Gaisser, Booksellers, 1242 Broadway, Toledo, Ohio 43609.

Psychosources, $5.00. Books for surviving the '70s. Free catalogue. BOOK COOPERATIVE, 2915 Broadway, NYC, 10025.

25% Off New Books ($42.50 Treasury American Design, $31.88). Bookquick, B-3, Roseland, N.J. 07068.

No Longer Responsible for the high cost of books. Write for Columbia University Press' WHALE OF A SALE and save up to 90% on over 500 different books. Dept. WS, Columbia University Press, 562 West 113th Street, New York, New York 10025.

FOREIGN BOOKS

The French Bookshop, 700 Madison Avenue (62nd Street), NYC, 10021, where French books are sold exclusively. List sent on request.

BOOKPLATES

Free Catalogue. Scores of beautiful designs. Personalizing and Special designing. ANTIOCH BOOKPLATE, Box 28A, Yellow Springs, Ohio 45387.

OUT-OF-PRINT

Name The Book. We'll get it! Free search service. CHICAGO BOOK MART, P.O. Box 613-B, Chicago Heights, Illinois 60411.

You Name It—We Find It. Satisfaction guaranteed. INTERNATIONAL BOOKFINDERS, Box 1-S, Pacific Palisades, California 90272.

Looking For A Book? Large stock, free search. Dabney Co., Box 31061-R, Washington, D.C. 20031.

ART

Collect Fine Original Etchings and lithographs by the world's great artists including Rembrandt, Picasso, Rouault, Soyer, Landau and Florsheim. Free illustrated catalogue and Master Print Supplement. (Mail 25¢ for handling.) Associated American Artists, Studio 8, 663 Fifth Avenue, NYC, 10022.

"Getting Started In Stained Glass." 30¢. Whittemore, Box D2065, Hanover, Massachusetts 02339.

New, Complete Publications Catalogue just published. Send 25¢ to Dept. P, Museum of Fine Arts, Boston, Massachusetts 02115.

RECORD MART/TAPES

Free 162-Page Catalogue offers over 1,000 fine recordings of Renaissance, Baroque, Classical, Romantic and Modern music. All late stereo recordings. Highest quality at budget label price. Available only by mail from MUSICAL HERITAGE SOCIETY, Box 932-SR, New York, N.Y. 10023.

MUSICAL INSTRUMENTS

Neupert Harpsichords, Clavichords. Oldest, finest. Free catalogue. MAGNAMUSIC, Sharon, Connecticut 06069.

18th Century French Harpsichord in kit form. We offer an authentic reproduction of an antique French double manual harpsichord with four registers and buff stop. Drawings, instructions, and all materials from Frank Hubbard, 185B Lyman Street, Waltham, Massachusetts 02154.

Bechstein: You'll be sure it's the best piano after you've tried them all. Piano Imports, John Wanamaker Philadelphia, Pennsylvania 19101.

Kits! Build dulcimers, guitars, balalaikas, thumb pianos, harps. From $2.95. Finished dulcimers from $19.95. 8665 West 13th Avenue, Denver, Colorado 80215.

PERIODICALS

Scientists, Engineers, Research Administrators—Drastic cuts and priority shifts in federal R&D programs make it more essential than ever to be ahead of the news from Washington. The most reliable method is to read Science & Government Report, the independent, twice-monthly newsletter that tells you what's going on inside NIH, NSF, DoD, NOAA, AEC, OMB . . . Researched and written by Washington's top science reporting team, Daniel S. Greenberg and Philip M. Boffey, both formerly of the Science magazine news staff. Read in over 1,500 universities, government agencies, industrial and government labs world-wide. $35 per year ($45 overseas). Science & Government Report, P.O. Box 21123, Section 4, Kalorama Station, Washington, D.C. 20009.

FILMS

Customized—color film titles for Super8 and 35mm slides. Free samples, brochure. MEDIA35, Box 7430SC5, Detroit, 48202.

COLOR SLIDES

35mm Color Slides, 10,671 individually sold, described encyclopedia-catalogue. 10¢. Wolfe Worldwide, Dept. 7-43, Los Angeles, California 90025.

SCIENTIFIC INSTRUMENTS

Giant Free Catalogue. Nearly 4,000 scientific bargains. War surplus! Astronomical and spotting telescopes, binoculars, microscopes, magnifiers, superscopes, lenses, prisms, project kits. Request Catalogue CR. Edmund Scientific Company, 300 Edscorp Building, Barrington, New Jersey 08007.

Scientific Models—Build accurate molecular models of *DNA, proteins, vitamins, etc. Send for catalogue* DH. SRM, Inc., Box 1422, Janesville, Wisconsin, 53545.

TEACHER INSTITUTES

Dr. William Glasser and staff conduct regional summer workshops. Write Seminar, Suite 518, 2140 West Olympic, L.A., California 90006.

Montessori Teacher Training. Beautiful campus. Largest U.S. training program. Nationally recognized *Montessori Certificate plus graduate credit. Help* answer need for Montessori teachers. Write: MMTTC, S.T., 1010 West Chicago Avenue, Chicago, Illinois 60622.

TEACHER INSTITUTES

Montessori Institute of Atlanta teacher training *course for teaching children 2½-7 years now accept*ing applications for September-1973. Accreditation and diploma granted: Association Montessori Internationale. Write P.O. Box 52602, Atlanta, Georgia 30305.

SUMMER SCHOOLS

Summer Session for bright students with messy scholarship past. Under twenty students. Innovative program of Vermont approved secondary school. Beautiful area. Community, nature, gardening, work, livestock, recreation and learning. AC 802-685-2239.

High School Students: SYRACUSE UNIVERSITY Summer Study Program. On campus, credit courses to advance mature precollege students. Syracuse summer scholar awards available. Recreation, cultural, social events directed by counselors, faculty. Art Workshop, Liberal Arts, School Press Institute, Law and Public Policy, Sciences, Theatre and Drama. Write PRECOLLEGE STUDIES CENTER, Dept. 213a, 906 South Crouse, Syracuse, N.Y. 13210.

Burnham-By-The-Sea, Newport, Rhode Island. Coed Summer Program for students 12-18 on beautiful oceanfront estates. All subjects. Small classes. Reading skills, study habits, typing. Music, art, drama. Photography, filmmaking. Olympic pool. All sports. Informal activities. 24th summer. Bulletin. George Waldo Emerson, 57-R Henshaw Avenue, Northampton, Massachusetts 01060.

SCHOOLS

Only In Boarding Schools—Would your son or daughter gain from having small classes and personal attention—meeting students from many states and countries—participating in many sports and activities—developing strong educational habits and interests to prepare for college? Write for an interesting statement about American residential schools and a listing of schools nationwide. Include your name, address, student's age, sex and grade. Indicate boys', girls' or coed schools and areas of the country preferred. Only In Boarding Schools, Box 2C, 32 South Street, Baltimore, Maryland 21202.

Interlochen Arts Academy. Accredited, coed college prep boarding school for students in grades 9-12. Specialized education in Art, Dance, Drama, Music. Full academic program. Distinguished resident and visiting faculty. Superior recreational facilities in a wooded lakeside campus. Catalogue: Director of Admissions, Room 307, IAA, Interlochen, Michigan 49643.

Vershire School—Coed secondary school (our 5th year) combining scholarship, adventure, work, creativity. Staff background Foreign Service, business, education, Peace Corps. Blending also Peace Corps approaches (*study in Mexico, Europe*) and imagination with desirable traditional goals. Near Dartmouth. Magnificent scenery. Fifty horses and *indoor riding ring . . . all very secondary to warm*, outstanding education. Vershire, Vermont 05079. 802-685-4547.

COLLEGES

Adult Degree Program for well-informed, highly motivated adults 26 and over wishing to complete liberal arts undergraduate education. Two-week resident periods on Goddard campus alternate with six-month independent study projects carried on at home under faculty supervision. Program leads to Goddard Bachelor of Arts degree. Write Box S, Adult Degree Program, Goddard College, Plainfield, Vermont 05667.

Seventy-Five Per Cent of the students who visited Franconia College last year enrolled. Those students were searching for a small, liberal arts, coeducational college with an open and informal atmosphere. Located in the White Mountains of New Hampshire, Franconia offers a workable alternative to the traditional college process. If you, too, are searching for an alternative, contact Admissions, Box SR, Franconia College, Franconia, New Hampshire 03580.

Montessori A.M.I. Teacher Training Course with laboratory *primary classes.* International recognition. Small, select student body. Write Admissions, SOUTHERN MONTESSORI INSTITUTE, 1517 Brickell Avenue, Miami, Florida 33129.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

COLLEGES

College Admissions Arranged—Law, Medical, Graduate, Undergraduate, Transfers, Drop-outs, Flunk-outs. (4 and 2 years.) (Also prep schools.) Specializing in difficult educational problems. Modest fees. EDUCATIONAL GUIDANCE SERVICE, Suite SR-1926, 342 Madison Avenue, NYC, 10017. 212-TN 7-8333.

FOR THE GOURMET

Wild Rice—2 lbs. $9.90 postpaid. Order from: Ojibwa Wild Rice Company, Box 33B, Erskine, Minnesota 56535.

Tea Devotees naturally select Grace Rare Teas. Free brochure. Grace Tea Importer, Dept. 473, 799 Broadway, New York, N.Y. 10003.

Wine Cellar—Traditionally designed units interlock. Grow from seven bottle rack $4.98 to 190 bottle $98.00. Free Brochure and Winemaker's Catalogue! ADD-A-RACK, Box 30230X, Cincinnati, Ohio 45230.

PERSONALS

Bleeding Madras . . . lovely as ever . . . other cottons . . . fabulous AVOCA Irish tweeds and blankets. Carol Brown, Putney, Vermont 05346.

Giant Free Catalogue. Nearly 4,000 scientific bargains. War surplus! Astronomical and spotting telescopes, binoculars, microscopes, magnifiers, sniperscopes, lenses, prisms, project kits. Request Catalogue CR. Edmund Scientific Company, 300 Edscorp Building, Barrington, New Jersey 08007.

Old Letters Wanted. Authors, scientists, military leaders, musicians, American statesmen, etc. Collections and important single items bought and sold. Especially interested in literary material. Catalogues issued. Walter R. Benjamin Autographs, Inc., 790 Madison Avenue (at 67th), New York, 10021. 212-RE 4-3902. Established 1887.

ALPHAPHONE™ headset—brain-wave trainer. Free literature. Aquarius Electronics, Box 627-C, Mendocino, California 95460.

Recorders—Finest Makes. Largest music selections. Free catalogue. RECORDER CENTER, Amenia, N.Y.

Can't Sleep? Mack's pillow soft Earplugs. The moldable noise silencer recommended by doctors. Guaranteed! Send $1.10 ppd. to McKeon Products, Dept. R, 23220 Ithaca, Oak Park, Michigan 48237.

Rubber Garments in fashion shades of LATEX and STARSHEEN (Continental) rubber. Illustrated catalogue $4.00 airmail from Kastley Limited, P.O. Box 24, Blackburn, Lancs., England.

Free Catalogue: Low direct prices. Diamonds, Sapphires, Silks, Cosmetics, Crystal, Hunting, Fishing, Camping Supplies. Herter's Inc., Dept. CS, Waseca, Minnesota 56093.

Recorders (Flutes) Kueng Swiss import $15.40 up; Purcell from $11. Student Special. Corelli $7.15; Recorder Instruction Kit, Soprano Recorder, Method Book, three 7" LP Instruction Records, boxed, $9.95, add sales tax plus shipping $1.50. Recorder Music Methods. Guitar Music. Free catalogue. 4-3-D HARGAIL, 28 West 38th Street, NYC, 10018.

Meditation evokes New Age consciousness. First-year bimonthly course free. MEDITATION, P.O. Box 566, Ojai, California 93023.

Valencias—All varieties Grapefruit. Shipping to 47 states, Canada and Europe. Free brochure. Airport Fruit Shipper, Miami International Airport, Miami, Florida 33159.

Top Cash Paid For Letters and documents of famous people. Immediate decision! Immediate payment. Ask TODAY for free brochure, "How To Sell Your Autographs." Catalogues issued. Charles R. Hamilton, 25 East 77th Street, NYC, 10021. 212-628-1666.

800 Children's Paperbacks—Catalogue 25¢. Childbook, 5126 Winston, Indianapolis, 46226.

Free Book. Prophet Elijah Coming Before Christ. Megiddo Mission, Dept. 14, 481 Thurston Road, Rochester, N.Y. 14619.

Sleep-Learning Equipment—Alpha devices. Strange catalogue free. Autosuggestion, Box 24-SR, Olympia, Washington.

Unusual Gifts By Mail. Free Catalogue. ROTAY Enterprises, Dept. R, 9504 Buck Lodge Court, Adelphi, Maryland 20783.

Writer Seeks Particulars career change dynamics. Box 127, Waccabuc, N.Y. 10597, please.

Unique Children's Gift—Magic Set. Entertaining, easy-to-perform magic with instruction booklet. Large set $10.65 (complete). Check or money order to: RIA Company, P.O. Box 253, Latham, New York 12110.

PERSONALS

Realistic Mother's Day Plaque: "Cope!" $5.00. Wry Ideas, Rye, N.Y. 10580.

Actively Buying and selling rare books and first editions. Catalogue for year $1.00. Minkoff, RFD 3, Box 147, Great Barrington, Massachusetts 01230.

Cigars For The Connoisseur! Finest imported La Reina de Manila Philippine cigars including Coronas Largas at $9.50 and Vegueros Especiales at $11 per box of 25 each or the superb Coronas Largas Especiales at $23 per box of 50. Interpacific Trading Company, 681 Market Street, San Francisco, California 94105.

Bread Loaf Writers' Conference. August 14th to August 26th. Lectures, workshops, conferences in fiction, nonfiction, poetry, children's literature. Bread Loaf, Box 303, Middlebury College, Middlebury, Vermont 05753.

Research, writing, translations, expertly done. All topics. Reasonable. Professional author. Alex White, Allenhurst, N.J. 07711.

SITUATIONS WANTED

Research Librarian, formerly with leading national magazine, seeks research, library or indexing position. Expertise in these areas plus knowledge of reference materials and information sources. Training in fields of international affairs/politics. New York-New Jersey, Washington, D.C. areas. Box I-263.

Administrator, Education/Management. Male, 48, family, degrees. Desperate. Box K-833.

Clinical Psychologist—experienced, cultured. Seeks temporary position. Europe. Box K-841.

Montessori Directress, American, B.A., certified Montessori Training Organization, London. Box K-850.

Companion, Travel, to female. Cultured, experienced, highest references. Box K-862.

Physics-Math-German Techer looking for interesting position. Box K-828.

EMPLOYMENT OPPORTUNITIES

Science And Math Specialists—A wide variety of excellent opportunities for teachers at all levels, K-12. Good references essential. Independent school background preferred. Placement Service, Independent Educational Services, 80 Nassau Street, Princeton, N.J. 08540 (a nonprofit corporation).

Teach/Live in Western America. Elementary and secondary teachers seeking placement information send $2.00 to Western Teacher Placement, P.O. Box 15237, Wedgwood Station. Seattle, Washington 98115.

Interesting European Jobs. Details $1.00. Alexander, Box 357-SR, South Pasadena, California 91030.

Male Companion—8 children aged 9-14, summer. L.I. shore and southern France. Box K-811.

Overseas Jobs—Now hiring, 103 countries, all occupations, high pay, free transportation, tax benefits. Latest computerized reports. $2.00. TRANSWORLD, International Airport, Box 90802-K, Los Angeles, California 90009.

Teaching Positions. In Foreign Countries. New 100-page guide contains information about organizations seeking teachers. Includes requirements, geographic areas, addresses for application forms. Guaranteed satisfaction. Special price $2.00. Foreign Countries, Box 514-K-52, Ames, Iowa 50010.

Exciting Overseas Jobs. Directory $1.00. Research Associates, Box 889-R. Belmont, California 94002.

Teachers, Administrators—Leading school, college placement sources. $3.00. E.I.S., Box 105, Chestnut Hill, Massachusetts 02167.

Australia—New Zealand Want You!!! 50,000 Jobs! Paid Transportation! Latest Information and Forms, $1.00. Austco, Box 3623-K, Long Beach, California 90803.

Overseas Opportunities—Now Available! Free Transportation! Complete information . . . plus Directory of 200 companies hiring thousands world-wide . . . all occupations. Send $2.00. International Opportunities, Box 29232-MT, Indianapolis, Indiana 46229.

Academic Journal. Includes school, college jobs, all levels, nationwide; Job Directories, Reports. April edition available now. $6.00. Education Exchange, Box 392SR, Newtown, Connecticut 06470.

World-Wide Hotel Chains need men, women, couples. Information, $2.00. Alexander, Box 357-SR, South Pasadena, California 91030.

Australian Opportunities—Paid Transportation! 50,000 Jobs! Latest reports on employment, business, farming, education . . . plus map, forms. $1.00. International Services, Box 19107-MS, Washington, D.C. 20036.

EMPLOYMENT OPPORTUNITIES

Community And Junior Colleges of the West. A directory of names and addresses listed by states. California, Hawaii, Oregon, Washington, Alaska, Idaho, Montana, Arizona, Nevada, Utah, and Colorado. $3.00 to Western Teacher Placement, P.O. Box 15237, Wedgwood Station, Seattle, Washington 98115.

Telephone Counselors Needed for women's medical clinic, all states. Work from home. Financially rewarding. Box K-835.

HOUSES AVAILABLE

FOR SALE

Moving To Cleveland? Suburban living, superior schools, near universities, integrated neighborhoods. Contact Shaker Communities, 3494 Lee Road, Shaker Heights, Ohio 44120. 216-751-2155.

Vermont. All-season chalets, village homes. Choice acreage. Free brochure. ROLAND BEERS & ASSOCIATES, Manchester, 05254.

Western Massachusetts—Charming, restored 8-room home. 4 fireplaces. Modern kitchen with appliances. Wideboard floors. Red barn. 4 acres on river. $40,000. Available immediately. 415-387-4148 or Box I-729.

Moving to Metropolitan St. Louis? University City is an exciting place to live. Central suburban location. Nationally recognized schools and universities. Cosmopolitan integrated community of 48,000. Outstanding city services. 13 parks, golf course, indoor-outdoor pools, new library. Contact University City Residential Service, 7515 Melrose, University City, Missouri 63130. 314-726-0668. A FREE SERVICE.

FOR RENT—FURNISHED

Vermont Mountain Hideaway—Privacy, views, decks, fieldstone fireplaces. Walk to swimming, fishing. HAWK, Box SR, Pittsfield, Vermont 05762. 802-746-5171.

FOR SUMMER RENTAL

Londonderry, Vermont—Secluded 3 story A-frame. 5 bedrooms, 3 baths, electric kitchen. Near swimming, golf, tennis, theatre, shopping. $175 week, $600 month. Allen, 5M, 333 East 30th, New York, N.Y. 10016.

Mountain View Dream House in Southwest Harbor, Maine. June-September. Weekly, monthly, seasonal. Call owner: 203-649-6556.

Secluded House, fireplace. Forests. Ponds. Near Woodstock. 802-763-7026. Hawk's Hill, South Royalton, Vermont 05068.

Cape Cod, Wellfleet—Charming 2-bedroom cottage, fireplace, well equipped. May-October weekly, monthly. $125-$175 per week. 617-395-6357.

Weston, Vermont—Rental July 15th-August 10th. Contemporary vacation home. Large acreage adjacent National Forest, complete privacy, fine view. SR Box K-837.

Mt. Desert Island, Maine—Family cabin on shallow water off Somesville Harbor. Washer, dryer. Mooring, dinghy. 2 acres, private road, sheltered tidal swim area. July, $850. Dr. Krevans, 161 Vicente Road, Berkeley, 94705.

White Mountains—Big lakeshore A-frame. July, August, $350 month. Box K-851.

San Francisco—3 bedrooms, garden, quiet. 6/20-8/30. SR Box K-840.

Lancaster County—Pennsylvania Dutch farm area. Beautiful, remodeled farmhouse. All conveniences, sleeps 8. Swimming, fishing, riding nearby. $1,100 month. July, August. SR Box K-827.

HOUSES FOR EXCHANGE

Rent-Free Vacations. Write Holiday Home Exchange, Box 555, Grants, N.M. 87020.

APARTMENTS AVAILABLE

FOR RENT

FURNISHED/UNFURNISHED

Ithaca, N.Y. Walk to Cornell campus for lectures, concerts. Fairview Heights . . . a new environment for living designed by Marcel Breuer. Write to Fairview Associates, 100 Fairview Square, Ithaca, N.Y., or call Mr. Sullivan, 607-AR 2-3420.

FOR SUMMER RENTAL

Sublet July-August—Furnished one-bedroom apartment in Wellesley (20 minutes to Boston). $220 month. SR Box K-844.

Quaint Carmel, California. 1-2 bedroom. Oceanfront. Weekly, monthly, seasonal. SR Box K-831.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

CLASSIFIED

APARTMENT FOR SALE

FURNISHED

5th Avenue And 61st Street, NYC. At $295,000 (price just reduced) it's a bargain. On the 40th floor of the Pierre Hotel, with sweeping views of the Park and the City.

Magnificently Furnished. Exquisite details throughout; marble floors and baths. Custom stereo system and variable custom lighting throughout.

Large Living Room, dining room or library, corner master bedroom, 2 fully equipped kitchens, powder room, bath. A sauna. Maintenance $1,350 monthly. Brokers protected. SEEING IT IS UNFORGETTABLE.

Samuel Finnerman, The Lansco Corporation, 122 East 42nd Street, New York, New York 10017. Tel: 212-TN 7-5555.

LAND FOR SALE

Martha's Vineyard—Water View. 1 plus acres, hilltop, protected privacy, $35,000. Box S128, Chilmark, Massachusetts 02535. 617-645-9712.

PROPERTY FOR SALE

One Of The Most Unusual And Spectacular homes in San Diego County, located approximately 4 miles southwest of Rancho Santa Fe, is now available because the owner has moved to the East. This new contemporary designed residence contains approximately 3,900 square feet on 4 different levels, consisting of a recreation room which is located on the lower level along with a full bath, a fireplace and a kitchenette, a main floor consisting of a living room with 22 foot ceilings, a dining doom with stained glass windows and an adjoining patio and kitchen with every modern convenience, a master bedroom on its own private floor with a spacious bath, dressing room, fireplace, and two balconies from which one can see the ocean to the west and the mountains to the south and east. Finally, on the top floor there are 2 bedrooms and a bath along with 2 studies which could be converted into 2 bedrooms.

The Pool is surrounded by real and imitation boulders and has every imaginable facility including high and low diving boards, waterfalls, slides, outdoor barbecue, wet bar, and snack bar as well as two unusual cavern-like dressing rooms (the owner has invested over $100,000 in this area alone).

A Recessed Lighted Tennis Court with dressing rooms is located a short distance from the house and to the south are stables large enough for boarding three horses but which are readily expandable.

There Is Also A Small House consisting of 2 bedrooms and a bath, which could be either servants' quarters or a guest house with certain renovations.

There Are 17 Acres which would be difficult to surpass in beauty and strategic location because of the magnificent view of the ocean and the mountains, along with a rolling green lawn and beautiful gardens with towering eucalyptus trees. This is a truly unforgettable estate in which the owner's investment is $585,000. The asking price is $495,000. Liberal financing is available.

ROBERT K. SMITH, Realtor, 7911 Herschel Avenue, La Jolla, California 92037. 714-459-4471.

Northern Vermont Real Estate. Brooks H. Barron, Kent Mitchell, Realtors, Hyde Park, Vermont 05655. 802-888-4287/2433.

Westhampton Beach, Long Island—Prime location. Exquisite oceanfront property—220' on ocean. Thickly landscaped for complete privacy. High dune with beautiful view. $150,000. Box 657, Westhampton Beach, Long Island, New York 11978.

Restored Colonial, fireplaces, modern country kitchen, exceptional guesthouse, swimming pool, trout stream, low taxes. Walker Realty, Manchester, Vermont 05256. 802-362-1020.

12 Acres, tumbling brook through a pine forest. Large main house, 22' x 28' living room, with floor to ceiling stone fireplace, 4 bedrooms, 1½ baths, modern kitchen, 4 room year-round guesthouse. $62,500. Free lists. Stone Ridge Realty, Stone Ridge, N.Y. 914-687-7172/687-7638. Open weekends; closed Tuesday.

Del Mar, California—Acreage for the builder/developer or hold as investment for future appreciation. 7.97 acres zoned R3-20 for multiresidential, planned development-condominiums. Prime location, finest parcel available in this area, strategically situated near University of California, La Jolla, and fifteen minutes from downtown San Diego. Unobstructed views of ocean/surf, Torrey Pines State Park and Beach and beautiful La Jolla. Booming economy factors—many new industrial, research and technological firms expanding to this locale. Priced for sale in three parcels: 1.53 acres, $250,000; 4 acres, $395,000; 2.44 acres, $270,000, or for sale as total package with financing available. Plats, maps and brochure available upon request. Call or write Mr. Robinson, McKellar & Wyer, Inc., Realtors, 2199 Avenida de la Playa, La Jolla, California 92037. Area Code 714-454-0493.

BUSINESS OPPORTUNITIES

Interested In Owning A Franchise?—Business of your own, or full- or part-time money-making opportunities? Find out what's available. Send name for FREE 5-month subscription to Salesman's Opportunity Magazine, Dept. 1185, 1460 Hancock Center, Chicago, 60611.

Own Texas Ranch, found oil and gas show. Need help test for pay. Good geology references, full information: R.M. Cooksey, 501 West 3rd Avenue, Corsicana, Texas 75110.

SAILING

Sailboat Rentals, instruction. Brochure from Stokes, RR 3, Bridgewater, Nova Scotia.

CAMPS

Cape Cod Sea Camps. Boys and girls, 7-17, resident and day. 190 acres, private beach, pool and lake. 60-boat fleet. Older campers may specialize. Full range of activities. Separate Junior Camp Counselor-camper ratio 1:6. 52nd season. Member A.C.A. Also pre-season Sailing and post-season Wrestling Camps. Write: MONOMOY-WONO, Box J, East Brewster, Massachusetts 02640.

High/Scope—Arts, science. Unusual opportunity for thinking teenagers to express abilities in responsive group. David P. Weikart, Ph.D., 1305 Sherman, Ypsilanti, Michigan 48197.

Brown Ledge—Mallett's Bay, Vermont, "One of America's finest camps." Girls 10-18. Free daily riding for all. Finest show horses, mounted lance drill, jumping. Sailing, racing tactics; water skiing, drama, swimming, tennis, golf, archery, riflery, crafts, trips. No extras! "The Complete and Different Camp." For booklet, state age and write to winter office: Miss Barbara Brown Winslow, 155 Dodds Court, Box C, Burlington, Vermont 05401.

Join A Marine Archaeological Expedition. Come help excavate an ancient sunken ship. Our professional staff will teach you how. Live aboard ship. Brochure: UNDER SEA ACADEMY, 1060-S Wildlife Road, New Kensington, Pennsylvania 15068. 412-335-8844.

Overweight Girls 8-18. Enjoy a summer of fun while losing weight at the original non-medical slim down camp. Complete sports programs. Re-education in eating habits. Usual weight loss 20-45 lbs. Winter follow-up program. For booklet, write Camp Stanley, Box 701, Hurleyville, New York 12747. Also Camp Tahoe for overweight boys. Phone 212-947-7749.

I Cycle: Biking, hiking tours. Peter Otten, Waitsfield, Vermont 05673. 802-496-2237.

Teenagers Rate Human Relations and our community spirit even higher than our arts, sports programs. They could be right! Coed 6-18. Brochure! Appel Farm Arts & Music Center, Elmer 22, New Jersey 08318. Phone 609-358-2472.

Seventeen Or Entering Twelfth Grade? The Farm and Wilderness Foundation offers places in counselor apprentice groups. Learn leadership skills, what makes people tick. Accept challenge of rugged work, wilderness trips, self-understanding. Varied summer under Quaker leadership.

Between Eleven And Fifteen. Three offbeat small camps:

Saltash Mountain, forty boys. Pioneering, lumberjack sports, extensive hiking and canoe trips.

Dark Meadow, forty girls. Ecologically sound way of life. Tipis, crafts using natural materials. Superb mountain lake. Hiking, canoe trips.

Flying Cloud, forty boys. Live like Indians, recreating rugged, age-old culture. Learn subsistence living. Swim, canoe, hike in unspoiled mountain wilderness. John S. Hunter, Farm and Wilderness Foundation, Woodstock, Vermont 05091.

Drama, Musical Comedy, Dance, Art, TV, Filmmaking—Public Performances, Sports. Nation's foremost summer training center, featured article in N.Y. Times —on Lake Sunapee, N.H. Coeducational. 10-18. 8 weeks, $1,195. Beginners Showcase Arts Center, Dept. 14G, 240 East 76th Street, NYC, 10021. 212-249-9288.

Judgment Ridge—Unique camp on thousand acres Vermont Mountains, Boys/Girls 8-16. Managed by ex-Peace Corps staff. Unpressured. Unlimited riding ($200 extra). 36 horses . . . beginning to advanced programs. Swimming, guitar, art, pottery, sports, gardening, construction. Individualized programs. A.C.A. approved. 100 camper limit: main camp. Small, affiliated specialized camps in wilderness and riding nearby. No poison ivy. RN resident. $750, $400 half season. Ingham, Vershire, Vermont 05079.

Working Cattle Ranch. Unusual opportunity for teenage youths to work along with cowboys in healthy mountain environment. Horse for each. Swimming, other events. Limited. Riva Land and Cattle Company, P.O. Box 66, Covelo, California 95428.

RETIREMENT LIVING

Retirement Living At Its Finest at Crestview Center in the heart of the residential metropolitan Toledo (Ohio) area. A specially-developed community where retired people share the security of health services, the comfort of never being alone, the assurance of protection against inflation, the independence of coming and going as they please. Life lease or a new monthly fee plan available. For complete information, write Mr. Maurice Seiple, Director of Development. Crestview Center, Harroun Road, Sylvania, Ohio 43560.

Live In Vermont—Beauty, history, covered bridges, mountains, lakes, auctions, antiques. You are invited to a very pleasant experience in relaxed living, to exceptional food, gracious service. Life as it used to be. Room and meals from $475 per month. Innkeeper, 20 Park Street, Brandon, Vermont 05733.

VACATIONS

Your Own Special Island, DRAKE'S ANCHORAGE, British Virgin Islands. Small, but not too small. Accommodates only 24, year 'round, in a friendly, informal cottage colony. Skindiving, swimming from gemlike beaches, boating, fishing. A tropical paradise. Fine food, cozy bar. DRAKE'S ANCHORAGE, 1230 Massachusetts Avenue, Cambridge, Massachusetts 02138. Tel. 617-868-0380.

Spear-O-Wigwam Ranch—Big Horn National Forest. Where Hemingway penned parts of "Farewell to Arms." Fishing, pack trips, wilderness hiking. Limit 30 guests. Box 1081, Sheridan, Wyoming 82801.

On A Clear Blue Lake. Cottage colony in towering pines. Fireplaces. Chalet rooms. Delicious meals. Water skiing, canoe trips, tennis, lobster bakes. Sauna, entertainment. Breakfast and dinner included. Color folder. Chute Homestead, Box S, Naples, Maine 04055.

Tobago Cottages—All sizes, locations, and rental rates. Cottage Owners Association, Box 194, Tobago, W.I.

David's Folly. Country living on Maine Coast. Seafood, garden vegetables, blueberry pies, coffeepot always on stove. Minerva Cutler, Brooksville, Maine.

Martha's Vineyard—Country inn amid pines. Rooms and private baths, with or without meals. Tennis court. Near beach. Holiday Special, $18 daily per person including meals. Major charge cards accepted. 617-693-2298. LAMBERT'S COVE INN, RFD, Vineyard Haven, Massachusetts 02568.

Somerset, England—Little terraced cottage with tiny garden. Suitable couple. Available June-September or for summer weeks as needed. SR Box K-861.

Complete Immersion—Gracious living in comfortable French home in rural BURGUNDY to realistically learn French, French cooking and wines. Only adults; up to 4 at a time. For information: J. Le Roux, Pailly 89640, Sergines, France.

Maine Windjammer Cruises! Sail the Maine coast aboard a schooner! Food, fun, accommodations for six carefree days: $135-$150 complete! Box 617SR, Camden, Maine 04843.

Patagonia Ranch Hideaway. Superb scenery . . . sun . . . air . . . for riding, swimming, tennis, birding. Circle Z Ranch, Patagonia, Arizona 85624. Brochure.

The Seaside—Favored smaller resort. Private beach. Near Sarasota. Longboat Key, Florida 33577.

Colonial Atmosphere Resort on lake in mountain area. Sandy beach, par 3 golf. Woodbound Inn, Box 190, Jaffrey, New Hampshire 03452.

A Cool, Clean Ten Miles At Sea . . . serene island, quiet, fourteen-guest inn, June-September. The Golden Gull, Box S, Monhegan Island, Maine 04852.

Quiet, Elm Shaded location near ocean, art galleries, shops, wharves. Small inn and motel with or without meals. Open to November. Tuck Inn Lodge, Box 118R, Rockport, Massachusetts 01966.

Join Us—Windows frame the wideness of the sea, porches overlook ocean. Motels, pool, coffee shop, lounge. Golf, fishing nearby. May into October. Brochure. 207-646-5662. Kathryn Weare, Cliff House and Motels, Box R, Ogunquit, Maine 03907.

Thorn Hill Lodge. Charming country inn on quiet hillside facing Mt. Washington. Swimming pool. $82 up weekly including 2 or 3 meals daily. J. Dunwell, Jackson, N.H. 03846.

Boothbay Harbor. Charming seacoast inn, motel on ocean. Informal. Modern. Modified American, European Plans. Restaurant features real "Down East" cooking. Cocktails. Scenic boat trips. Motel mid-May to late October. Inn late June-September. Ocean Point Inn, Box A10, Ocean Point, Maine 04557.

Parador Martorell, inn by world famous Luquillo Beach. Box 384, Luquillo, P.R.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

VACATIONS

Lake Tahoe, California—Beautiful, modern, fully-equipped 4-bedroom (10 beds) condominium on Lake Tahoe. Lake view, private beach, heated pool, tennis courts. $350 week. Season rental available. Ask for Unit #142. Call 916-583-3704.

A Treasure by the sea. Unique oceanside resort apartments. Leisure living in tropical tranquillity—or exciting sport fishing and imaginative underwater exploring. Interested? Sunburst South Resort, Box 145, Islamorada, Florida Keys, 33036.

Windjammer Vacation—Sail from Rockland, Maine to picturesque islands and harbors in Penobscot Bay. $150 weekly. Brochure. Schooner RICHARD ROBBINS, West Bath, Maine. Phone 207-443-3805.

San Francisco On A Budget? Charming, centrally located. Hotel Beresford, 635 Sutter Street, San Francisco, 94102.

Camden, Maine. A seacoast village where the mountains meet the sea. Windjammer cruises, lobster boats or just quiet contemplation. WHITEHALL INN has reflected this magic and beauty since 1902. An historic Inn offering memorable meals, fine wines and spirits. June-November A.P., M.A.P. Write Box S-424, Whitehall Inn, Camden, Maine 04843.

Martha's Vineyard Island. Escape to island pleasure for charm, beauty and friendliness. Lovely old harbor towns, breathtaking scenery, cameo beaches, whispering ocean, towering cliffs, amiable living, all sports. Hotels, cottages, efficiencies, motels, guest houses. Tell us your needs, arrival, length of stay. Martha's Vineyard Information, Vineyard Haven C, Massachusetts 02568.

Not Just Camp, but Transnational Summer In Northern Denmark. 13-18 years. Write: Dr. Manheimer, Mollevej 5, Nors, 7700 Thisted, Denmark.

Goose Cove Lodge on Deer Isle, Maine, In East Penobscot Bay. Sailing, fishing, hiking and picnics. Trained naturalist for nature lovers. An artist's paradise. Extra emphasis on ecology in June. Write for brochure. Dr. R. A. Waldron, Owner-Manager, P.O. Sunset, Maine 04683.

Vacation In Vermont—The beckoning country. Beauty, history, covered bridges, mountains, lakes, auctions, antiques. Relaxed living, exceptional food and beverages, gracious service. Immaculate, well-maintained Inn. Swimming pool. Memorable, reasonable. Telephone 802-247-5766. Write Brandon Inn, Box 206, Brandon, Vermont 05733.

Colorado Mountains—families needed to enjoy rugged mountain recreation, 1,300-acre ranch village, 30 modern vacation homes, near National Forest, old silver mines, pioneer esoteria. LCR, Box 789, Buena Vista, Colorado 81211. 303-395-8390.

Nantucket, Island of Enchantment, 30 miles at sea, less than one hour by air from New York or Boston. Sandy beaches, warm water swimming, surfing, golf, your favorite sports, varied evening entertainment. Well-equipped boat basin. Modern accommodations. Excellent restaurants. Advance reservations recommended for August. Free illustrated booklet. Information Service, 45 Federal Street, Nantucket, Massachusetts 02554.

Small Inn, Penobscot Bay, emphasizing fine food, island relaxation, nature walks. Rates include breakfast, dinner. Write: Peter Goodwin, The Bridgeside Inn, Vinalhaven, Maine 04863.

Whitneys' . . . Charming Inn off beaten path. Rooms, Cottages, Motel. All seasonal sports. Famous food. AAA. Summer Season 1973, June 17th-October 14th. Don and Kathie Murray, Dept. 6, Jackson, New Hampshire 03846.

Plevna, Ontario—Birch Lodge on Buckshot Lake. American Plan and housekeeping. 613-479-2215.

Schooner Timberwind Sails Maine Coast. Week includes island hopping, new friends, wonderful food, exciting sailing. $165—no extras. Brochure. Schooner Timberwind, Box 247-B, Rockport, Maine 04856.

Hotel On Small Island—Pool, superb beaches, remote, peaceful. $25 double. Write Sportsman's House, Vieques Island, Puerto Rico 00765. 809-741-3751.

Shelburne Museum Tour—45 acres, 35 buildings. Price includes ticket to museum, breakfast, dinner, gratuity, tax, air-conditioned motel. May 15th to June 30th and September only. $20.95 per person, double occupancy. Shelburne Inn, Shelburne, Vermont 05482.

Wild Loons Call from Indian Lake's clear mountain waters, Adirondacks. American Plan, families, adults. Rustic, informal. Sailing, horses, canoe and backpacking trips. Timberlock, Sabael, N.Y. 12864.

Beach Plum Inn, Menemsha, Martha's Vineyard, Massachusetts 02552. Small, informal, charming accommodations, overlooking sea, superb cuisine. M.A.P. All sports. $22-$32 daily per person. May-September. 617-645-9454.

SUMMER STUDIES ABROAD

France-Humanities—Perpignan, Pyrenees, Carcassonne, Barcelona. Arts, Architecture, Music of Roussillon, Language, Ages 19 plus. European Language Institute, 507 Fifth Avenue, New York, 10017. 212-867-7264.

Summer In Greece: The Athens Centre for Creative Arts. Music, archaeology, painting, poetry, literature, theatre; seminars, workshops and festivals. Sea and sun in Athens and the islands. June or July. Tuition $350. Write: The Athens Centre, Philadelphia Music Academy, 313 South Broad Street, Philadelphia, Pennsylvania 19017.

Holiday Study Tours—Visit Palladian homes in Italy this May or study Norman civilization in England and France next August. Three weeks, $750 inclusive. ASSOCIATION FOR CULTURAL EXCHANGE, 539 West 112th, NYC, 10025. Tel. 212-666-1605.

Oxford Summer Schools. Revolution and change in contemporary society. Celebrity speakers. Three 2-week sessions, June and July. Write Alternative Society, 9 Morton Avenue, Kidlington, Oxford, England.

Rome, Italy. Fourth consecutive summer. Stimulating faculty, diversified curriculum including Etruscan archaeology. $765. June 18th-July 22nd. Trinity College/Rome Campus, Hartford, Connecticut 06106

The Theatre-Lover's Fortnight '73. July 2nd-16th, $295. New Residence Hall, London University, single room, meals. Tuition and lectures. Plays. Chichester and Stratford Drama Festivals. Air fare $200. Symposium Seminars Abroad. Director: Edith Wegman, 714 Park Towne West, Philadelphia, Pennsylvania 19130.

College Humanities Consortium: Europe June 18th-July 19th, 1973. Credit: Art, Humanities, History. $870. Write Box 6597, Hampton, Virginia 23368.

Europe At Moderate Cost: Ages 9-14, 14-18. Travel-study programs in France, Spain, Austria, other countries. From $595, including flights. Also Camp in Spain. European Language Institute, 507 Fifth Avenue, New York, 10017. 212-867-7264.

University Of Massachusetts Summer Program in Bologna, Italy: June 15th-August 25th. Courses in Art, Literature, Anthropology, Language. Six credits. Free travel time at end of session. Cost $875, including field trips. Write: Director Summer Program in Italy, Department French-Italian, University of Massachusetts, Amherst, Massachusetts 01002.

Summer Study Abroad gives dates, subjects, prerequisities, costs for 650 programs in 60 countries. Send $2.00 to IIE, 809 United Nations Plaza, New York, N.Y. 10017.

Louisiana State University in Munich Summer School—June 2nd-July 15th. 70 accredited courses (freshman through senior and graduate) in humanities, arts, and social sciences. Instruction in English. Earn 9-credit hours. Tuition $312. Housing on request. Write for brochure, Dr. Gordon Mueller, LSUNO, Box 1315, New Orleans, Louisiana 70122.

STUDIES ABROAD

American Education In Switzerland. Leysin American School for University Preparatory Studies. International Environment. Coeducational, grades 9-12, boarding, 200 boys and girls. Experienced, qualified U.S./international staff, teacher-pupil ratio 1:10. Solid academic program, advanced placement, PSSC Physics, Chemstud, BSCS Biology; strong Mathematics, Foreign Languages. Curriculum related European tours. Alpine and winter sports. Excellent college admissions record. Affiliated with the American College of Switzerland. Write: Leysin American School, 1854-T Leysin, Switzerland or Hans T. Spengler, U.S. Representative, 330 East 49th Street, New York, 10017.

Hacienda El Cobano. The University of Oklahoma's Study Center, Colima, Mexico, offers credit and non-credit programs for 1973.

Spanish: High school, adult and college level.

Workshops: High School Art Workshop. Watercolor Painting, Archaeology, Ornithology, Latin American Feminism. Creative Writing, Mexican Investment and other programs as requested. Dr. Richard Hancock, 555 East Constitution Avenue, Norman, Oklahoma 73069.

Praestegaard Film-Video-Photography—A school/workshop/community with complete working and living facilities. Write: David Nelson, Director, PRAESTEGAARD, Kettrup pr., 9690 Fjerritslev, Denmark.

Columbus International College of Spain—A 2-year American liberal arts University in Seville. Freshman-sophomore curriculum, American faculty, dormitory boarding, Fall-Spring semesters. Write: Columbus International College, Avda Victoria, 43, Seville, Spain.

STUDIES ABROAD

Liberal Arts In Rome. Temple University's College of Liberal Arts offers full credit courses at its Rome campus for the academic year '73-'74. Courses offered: Anthropology, Archaeology, Baroque Art and Literature, Film and Filmmaking, History, Independent Studies, Italian Folklore, Italian Language and Literature, Philosophy, Political Science, Renaissance Art and Literature and Urban Studies. Contact: Temple Abroad, Mr. Dennis L. Tarr, Temple University, Philadelphia, Pennsylvania 19122. 215-787-8441.

Photographic Arts In Denmark—Photography and cinema in a Fine Arts program at KYO Castle in north Jutland. The accredited Limfjord College has openings for '73 semesters. Write: Box 408, Amstelveen, Holland International Administration office.

TRAVEL

For High School Students and Graduates. Stay in Soviet youth center. Or join African Safari; ski in August at Mont Blanc; bike in Denmark; ride horseback on beaches of Brittany; sun on French Riviera; speak French in France or Spanish in Spain; live with European family. Festivals, theatres in London, Paris, Moscow. Unique summer travel in Europe—Russia—Africa, 22nd year. Write: George R. Shumlin, Putney Student Travel, Putney, Vermont 05346.

Solar Eclipse! All inclusive tour to the heart of the Sahara to view the longest Eclipse in this century. Including all meals, accommodations, tents at the site, flights to Dakar, Gao, Timbuctu. Land rovers to Tassilit. Return via Abidjan. 17 days, $1,498 per person. Depart June 19th, return July 6th. For information, write African Explorers, Professional Building, Route 9, Parlin, N.J. 08859 or phone: (N.Y.) 212-356-3434, (N.J.) 201-721-2929.

Bike Across Italy—2 weeks, $175. Write Rod Price, 720 South 43rd, Boulder, Colorado 80303.

Summer '73—Camping, hosteling, backpacking teenager trips in Europe. Travel by bicycle, horse, kayak or minibus in small groups. Special sections for college age and 12-13 year olds. Brochure available. Freewheel Express Ltd., 11 Waverly Place, NYC, 10003. 212-674-1240.

Auto Babysitters—INDOOR parking. Rates LOWER than long-term outdoor airport/pier parking. Pickup/delivery. Branches throughout NYC. Savoy Garage, 827 Sterling Place, Brooklyn, N.Y. 11216. 212-493-9800.

This Ad + $8.00 per person, double occupancy, entitles you to real value New York. Next time try CENTURY-PARAMOUNT HOTEL, 235 West 46th Street, convenient theatres and everything; 650 rooms, with bath, TV, air conditioning. Single-$12.00. Don't delay, reserve now. This is a "sleeper" in every sense.

Europe Via Microbus. Small, flexible, coed groups. 3-7 week trips from $495. Free brochure. Travel Easy, Dept. S, 48 West 48th Street, NYC, 10036. 212-575-9270.

Russia/Scandinavia—5 weeks, $387. Also Europe, Africa, India. Camp with small, international groups ages 18-30. London departures. Write: WHOLEEARTH, Box 1497, Kansas City, Missouri 64141.

Worldwide Freighter Guide—$1.75. Rates, schedules. 700 passenger carrying Freighters. TravLtips, 40-21ZSC Bell, Bayside, N.Y. 11361.

Bicycling-Hiking-Camping trips through the countrysides of the world for 14-17 year olds. Europe, New England, Colorado, Canada. Free brochure includes bicycle equipment catalogue. Student Hosteling Program of New England, Inc., Rochester, Vermont 05767. 802-767-3297.

For Student Travel or Study or Camping or Summer Ski Camp. HIGH SCHOOL-COLLEGE. Small groups . . . leisurely pace . . . lively, flexible programs . . . leaders of caliber, taste and wit . . . Western Europe, Scandinavia, Greece, Russia, Yugoslavia, Israel, Africa. 16th year. Students Abroad, Mark and Harriet Parets, Directors, 771-S West End Avenue, NYC, N.Y. 10025. 212-928-7878.

Colorado River—white water rafting; Navajo Reservation—tutoring, sheep herding. Scotland and England—pony trekking, sailing. Also cycling, hiking, camping, hosteling trips. 10 teenagers and adult leader travel the back roads of Europe, North and South America. Free Brochure. Under The Stars, 2 West 45th Street, NYC, 10036. 212-877-6698/687-8119.

Personal Tours Of Britain—An atmosphere as if accompanied by a personal friend. Our well-educated English guides will take you by car to lovely unspoiled countryside and historic places at a reasonable price. Please write for brochure NY(R), Personal Touring Services, 62 Highlands Court, London SE19 1DS, England.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

KINGSLEY DOUBLE-CROSTIC

Reg. U. S. Patent Office

By Janet Elliott Cameron

No. 2036

DEFINITIONS

A. Indeterminate length of time (3 wds.)

B. February's birthstone

C. Power of action

D. Starred with Rex Harrison in *The Agony and the Ecstasy* (2 wds.)

E. Due to (4 wds.)

F. Kind of lizard

G. Belgian town on German border; scene of heavy fighting during the Battle of the Bulge

H. Edwin McMasters ——, secretary of war (1862–1867)

I. Physical characteristics of a geographical region

J. Stubborn

K. U.S. Lawn Tennis Association national champion in 1969 (2 wds.)

WORDS

55 50 74 42 32 203 91 46 37 136 14

106 30 89

73 15 33 58 43 146 218 86

70 149 129 175 23 16 210 207

198 79 44 38 57 137 227 34 193 24 107

90 47 75

132 66 109 35 54 225 177 116 143 145 39

192 82 160 51

29 65 190 176 81 229

48 197 62 105 128 17 85

108 52 179 19 167 158 230

102 56 112 127 71 226 20 222 195

232 60 201 76 104 213 45 40

72 189 41 63 77 163 36 216

DEFINITIONS

L. Looks promising (2 wds.)

M. Book by Margaret Ayer Barnes (3 wds.)

N. Wisdom and skill in the management of public affairs

O. Unfortunately, this garment is no longer worn only by males (2 wds.)

P. Hazardous enterprise

Q. Floral emblem of the imperial family of Japan

R. Rare steel-gray metallic element

S. *High-spirited*

T. Carrie Snodgress and Richard Benjamin starred in this film (5 wds.)

U. "The —— Saturday Night": poem by Robert Burns

V. *Invest with ministerial* or sacerdotal functions

W. Pat Boone's trademark (3 wds.)

WORDS

188 147 223 130 113 21 181 78 170

135 126 148 187 53 59 22 31 80 220 49

95 152 111 157 183 99 174 194 125 118 6

61 133

166 212 7 124 161 182 123 64 13 219

120 4 142 100 8 231 92 110 164

25 153 121 10 185 84 93 205 211 200 134

98 159

9 156 138 173 26 184 114 221 228

117 169 233 69 131 162 154 27 215

67 171 141 87 214 103 1 144 178 155 101

206 139 217 234 119 83 224 11 97

202 2 115 28 18 199 172

12 3 94 168 209 151

204 140 150 191 165 96 88 122 180 196 208

68 186 5

DIRECTIONS

Don't let the definitions scare you. If you can guess five or six of these WORDS correctly, you should be able to solve the Double-Crostic . . . . When you've guessed a WORD, fill in the dashes, and also write each letter in its correspondingly numbered square in the diagram. When all the squares are filled in, you will have a quotation from a published work. Dark squares indicate the ends of words. If there is no dark square at the right side of the diagram, the word carries over to the next line . . . . You should be able to see words and phrases begin to form in the diagram on the basis of having just a few letters. Enter the letters you can guess into the diagram and the blanks in the defined WORDS, and you'll find yourself working from WORDS to diagram and back, solving the puzzle. . . . The initial letters of the defined WORDS spell the name of the author and the title of the work from which the quotation was taken. This acrostic feature can be very helpful to the solver.

			1 T	2 U	3 V	4 P	5 W		6 N	7 O	8 P	9 R	10 Q		11 T	12 V	13 O	14 A
	15 B	16 C	17 Q	18 U		19 H	20 I	21 L	22 M		23 C	24 D	25 Q	26 R	27 S	28 U	29 F	30 A
	31 M	32 A	33 B	34 D		35 E	36 K		37 A	38 D	39 E	40 J	41 K		42 A	43 B	44 D	45 J
	46 A	47 D	48 G	49 M		50 A	51 E		52 H	53 M	54 E		55 A	56 I	57 D	58 B	59 M	60 J
61 N	62 G	63 K	64 O	65 F	66 E		67 T	68 W	69 S	70 C	71 I	72 K		73 B	74 A	75 D	76 J	77 K
78 L		79 D	80 M	81 F	82 E	83 T	84 Q	85 G		86 B	87 T	88 W	89 A	90 D		91 A	92 P	93 Q
94 V	95 N		96 W	97 T		98 Q	99 N	100 P	101 T		102 I	103 T	104 J		105 G	106 A	107 D	108 H
—	109 E	110 P	111 N	112 I	113 L	114 R	115 U		116 E	117 S	118 N	119 T	120 P	121 Q	122 W	123 O		124 O
125 N	126 M		127 I	128 G	129 C	130 L	131 S	132 E	133 N	134 Q	135 M	136 A	137 D		138 R	139 T		140 W
141 T	142 P	143 E		144 T	145 E	146 B	147 L	148 M	149 C		150 W	151 V		152 N	153 Q	154 S		155 T
156 R	157 N	158 H	159 Q	160 E	161 O	162 S	163 K	164 P		165 W	166 O	167 H	168 V	169 S	170 L	171 T	172 U	173 R
174 N	175 C	176 F	177 E		178 T	179 H	180 W	181 L		182 O	183 N	184 R	185 Q	186 W		187 M	188 L	189 K
190 F	191 W		192 E	193 D	194 N	195 I		196 W	197 G	198 D	199 U	200 Q	201 J		202 U	203 A	204 W	
205 Q	206 T	207 C		208 W	209 V	210 C	211 Q	212 O	213 J	214 T		215 S	216 K	217 T	218 B	219 O		220 M
221 R	222 I	223 L		224 T	225 E		226 I	227 D	228 R	229 F	230 H	231 P	232 J	233 S	234 T			

Solution of this issue's Double-Crostic will be found on page 69

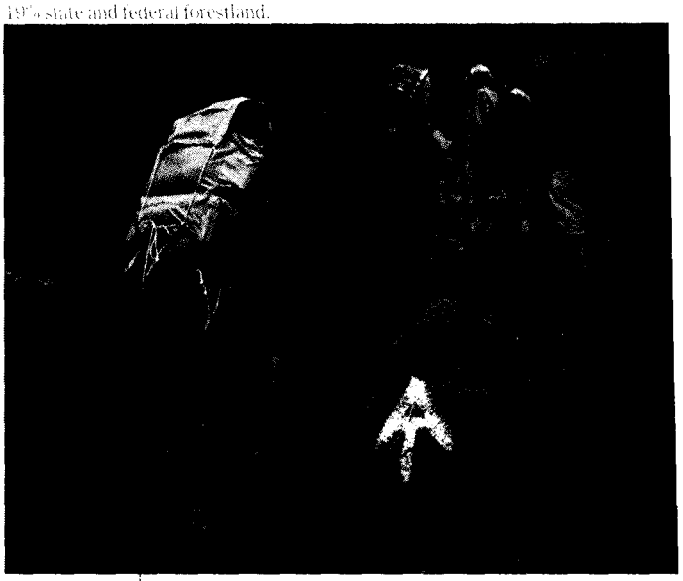
BRAND-NEW DOUBLE-CROSTICS, NEVER BEFORE PUBLISHED, ARE NOW AVAILABLE IN BOOK FORM, SPIRAL-BOUND, FROM YOUR BOOKSELLER OR SATURDAY REVIEW PRESS, 380 MADISON AVENUE, NEW YORK, NEW YORK 10017.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The American forest still belongs to the American people.

[illegible] private forestland [illegible]
[illegible] side of parks and wilderness areas.

19% state and federal forestland.



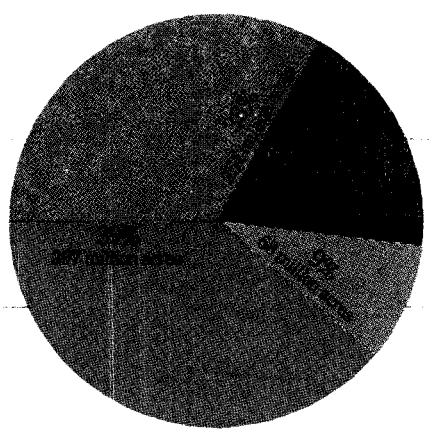
And to a *lot* of people.

To begin with, four million individual Americans own 39% of the entire forest—a forest that's still nearly three-fourths as large as it was when Columbus landed.

Then, too, *everybody* shares ownership in that 19% of the forest owned by federal and state governments which supplies so much of the raw material for building our houses and cities and making our paper products.

And when you add the 17 million acres of forestland that's been set aside for parks and wilderness areas, and the government land not suitable for growing commercial trees, the American people—individually or collectively—own 91% of America's 753 million acres of forest.

So if the forest industries seem



to own more than their 9%, it's probably because with responsible, scientific management they've been able to make this 9% produce 26% of all the raw material we need for today's wood and paper products, and still keep America green and growing.

Source: Department of Agriculture, U.S. Forest Service

For the whole story on America's forest today, get "Forests USA." For your copy of this full-color, 16-page booklet, send 25¢ to AFI, P.O. Box 963, Arlington, Virginia 22216.

Name

Address

City

State Zip

American Forest Institute 14

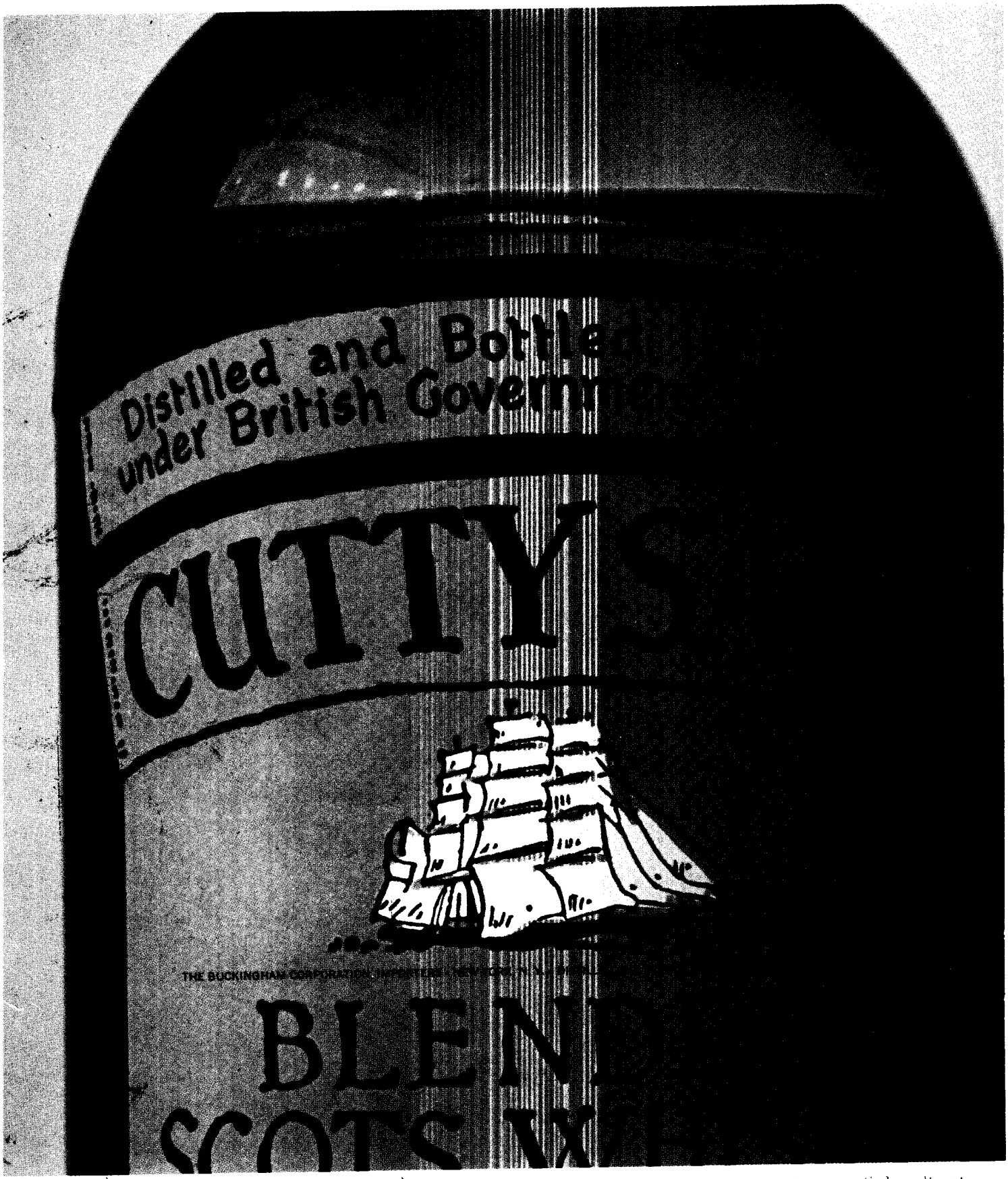
[illegible] ally owned forestland.

9% forest products industry forestland.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

AMBASSADOR COLLEGE LIBRARY
Big Sandy, Texas

"I'll give up my 'Mrs.' and call myself 'Ms.', but...



I won't give up the ship!"

all the adjectives.
thing that matte
is taste.
bottle.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED